

Railway Age Gazette

FIRST HALF OF 1916—No. 20

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Railway Age Gazette

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*Illustrated.

Slamming of vestibule trap-doors and loud talking by trainmen—especially loud talking on platforms around sleeping cars at night—are among the items to

The Hydra-headed Noise-Nuisance to be attended to by the Southern Railway in its renewed noise-suppressing campaign, just announced. It is gratifying to see that the Southern's

noise-committee is grappling with new as well as old nuisances. We could name roads where the slamming of the trap-doors on cars has been a nuisance to passengers for many months, but where no inspector seems to have noticed it. And this nuisance is worse on coaches than on any sleeping car, for in day cars passengers sit quite near to the doors. In the Southern's announcement, the words "KEEP QUIET" appear in capital letters. It is to be hoped that the company's inspectors are imbued with the same purpose as that manifested by the printer of this circular—the purpose to emphasize this one simple idea. Signals to engineers by word of mouth, and allowing steam to escape near sleeping cars, are among the other objectionable practices specified in the circular; but these and all other annoyances are reduced when that one "slogan" is reiterated with sufficient frequency and vigor. Simple regulations for the conduct of sane railroading ought not to need reiterating, except to new men; but, taking things as we find them, it seems proper to suggest that this branch of "spring house-cleaning" calls for attention North, East and West, as well as South. Not the least significant clause of the Southern's circular is the last one; "the superintendents are giving personal attention to this problem."

It is interesting to consider from one or two standpoints the possible results obtainable by providing a certain amount of flexibility in the driving wheelbase of multi-axle locomotives.

Flexibility in Driving Wheelbase As applied to the front driving axle of locomotives of the 2-10-2 type, a means for providing such flexibility has resulted in the

easier rounding of sharp curves and a consequent reduction in flange wear. Considering the position of the wheels of a locomotive of this or a similar type when passing through a curve, it would seem that almost as much good would result from flexibility provided by increased lateral movement of the back driving wheels. The greater side play at both ends of the driving wheelbase should reduce the flange wear on these

large locomotives to a minimum, with a consequent reduction in tire maintenance and renewals. While no figures are as yet available concerning any possible increase in maintenance costs due to the addition of such a feature to a locomotive, it is not likely that they would be great as compared with the direct savings, aside from the other advantages gained. Another possibility in the employment of this flexible arrangement may be seen in the case of a railway which is in poor physical condition and is confronted with the problem of increasing train loads. The natural way to accomplish this would be to purchase larger power, but this might require the renewal or strengthening of track and bridges at a heavy outlay. The requisite hauling capacity could be obtained by the purchase of locomotives so designed as to distribute the weight over a large number of axles, and the difficulties affecting the operation of such long wheelbases around sharp curves be avoided by the provision of additional lateral play at the front and back drivers. By following such a course, it seems quite within the bounds of probability that the expenditure for improved roadway might thus be postponed to a time when the earnings would have increased sufficiently because of the greater train loads.

In the *Railway Age Gazette* of November 26, 1915, we called attention to the fact that the railways recently have

Reducing Loss and Damage Claims been achieving good results in applying "safety first" principles to the handling of freight. The statement was based on a report of the Committee on Packing, Marking and Han-

dling of Freight of the American Railway Association, showing that 99 roads had reduced their payments for loss and damage to freight in the first six months of 1915, by \$3,500,000, as compared with a similar period in 1914. The report of the committee presented at the American Railway Association meeting this week shows that the good work is not only being continued, but is being improved upon. Reports from 112 roads for the entire calendar year 1915 show a decrease of \$7,626,519 in loss and damage claim payments as compared with 1914. The improvement in the first six months was indicated by a decrease of about 22 per cent in claim payments in a period when the volume of traffic was decreasing, but in less proportion. The decrease for the entire year was nearly 24 per cent, while the volume of business handled showed a slight increase. The total payments for

loss and damage for the 112 roads amounted to \$31,916,543 in 1914, and only \$24,290,024 in 1915, and as the number of roads as used by the committee refers to systems rather than to individual companies these figures represent nearly all the railroads of the United States. Twenty-six large roads submitted reports showing their payments for loss and damage classified as to commodities, indicating an improvement as to practically all commodities except eggs, grain and perishable freight. The committee's report shows that strenuous efforts are being put forth by the carriers to reduce loss and damage to a minimum. The question of loss and damage to perishable freight is being actively investigated by two committees, one representing the eastern roads and the other the western roads, acting in co-operation with the American Railway Perishable Freight Association and with the Committee on Packing, Marking and Handling of Freight, and not only all departments of the railroads but all the various associations have been requested to co-operate in the formulation, improvement and enforcement of rules to prevent loss and damage. Such an encouraging report should be a source of gratification not only to the railways, but also to the shippers, as it shows they are getting better service.

THE PROBLEM OF THE ROCK ISLAND

THERE has been much heated discussion between the various factions directly interested as to what the Chicago, Rock Island & Pacific needs in order to put it on its feet. One faction contends that it is badly operated, and that all that it needs is an improvement in its operation and a comparatively small expenditure of new capital. Another contends that it has been well operated; that the trouble is that not enough has been spent on improvements in it; and that a large amount of new capital must be raised and invested in it before it will become able to operate as economically and to render as good service as it ought to.

The *Railway Age Gazette* publishes elsewhere in this issue a study of the Rock Island prepared by a member of its own staff after a personal inspection of 3500 miles of its main and branch lines and the examination of a large amount of data bearing on the situation. The available evidence does not support the contention that the road has been badly operated. On the contrary, it shows that it has a strong operating organization, and that the organization has handled the property as economically as has been reasonably practicable under the conditions. It also shows that the new investment for improvements which has been made in the road has been small—much smaller comparatively than that which has been made in most other stronger lines; and it indicates that until a very much larger investment has been made in improvements it will never be possible to operate the Rock Island with an approach to the maximum practicable economy. It needs a large amount of second track, many long passing tracks, reduction of grades in many places, and large additions to its yard and terminal facilities.

J. W. Kendrick estimated the capital expenditure needed to June 30, 1919, at \$27,204,000. He thought if this amount were judiciously laid out the saving in operating expenses for the fiscal year ended June 30, 1919, would reduce the operating ratio to 68.3 per cent and in 1921 to 64 per cent. Mr. Kendrick is a very eminent operating expert and engineer, but it is difficult to see how the results he predicts could be secured by the comparatively small expenditure he suggests. It would seem to be nearer the mark to say that the Rock Island needs an expenditure of new capital three times as great as the amount he mentions. His estimate for grade revision, new lines, sidings, second track and yards and terminals is only \$8,200,000. This is a very small sum compared with those which have been spent by competing roads in the same territory for similar improvements.

Assuming that the Rock Island does need a very large expenditure of new capital, it is evident that the present holders of its securities must make some substantial sacrifices in order to raise the money. The Amster faction is advocating a policy of palliation. What the road needs is the adoption of a drastic policy by which either the present stockholders will be obliged to supply a large amount of capital or to turn the road over to stockholders who will. The question is not one which concerns merely the factions involved. It is also one which concerns the public. The policy adopted should be energetic and broad enough to make sure that the Rock Island will be put in a position where it will become able to render the best practicable service to the public, at the least practicable cost; and a policy of administering palliatives will not have this result. The question as to who is responsible for its present situation is now one of relatively little importance. The great question is as to whether it is going to be put in a position where it can be operated economically and well in the future.

CULVERT LOADING

DISCUSSION of the subject of culverts usually brings forth reference to "arch action" and there seems to be a general impression that the kind providence which "tempers the wind for the shorn lamb" also reduces the load on the weak culvert. This conviction is not always borne out by the facts. "Arch action" becomes effective in relieving the culvert of some of its superimposed load only when the filling immediately above it is compacted less thoroughly than that above the ground surface on either side. Thus the driving of a tunnel causes sufficient settlement in the rock just over the crown to produce a natural arch in the material above. Similarly a pipe placed in a trench does not carry the full load because the settlement of the less firmly packed back-filling is resisted by friction on the sides of the trench.

On the other hand consider a concrete box culvert placed on rock and covered with a high embankment. As the filling over the culvert is placed at the same time as the rest of the embankment, it settles according to the same laws and as the culvert can not settle, there is no reason why a square foot of the top of the culvert should not carry the entire load of earth directly over it, exactly like any square foot of the adjacent rock surface. The same argument holds for any rigid culvert with a solid floor footing, when placed on soft foundations. As the bearing pressure under the culvert is practically the same as that on the ground surface along side, the weight of the fill depresses the culvert exactly the same as the ground surface adjacent and the filling over the culvert is no less compact than elsewhere.

There are, however, circumstances under which the equilibrium does not obtain. A culvert placed on a pile foundation will settle less than the surrounding soil, with the result that it will carry more of the embankment than that contained in the vertical prism above it. On the other hand, a culvert that settles more than the surrounding ground surface will not carry its full share of the load. This will occur with a culvert not having a solid floor footing, for since the footing area is reduced, the bearing pressure is higher than on the adjacent ground, and the settlement is consequently greater. A means not often suggested which will accomplish this same object is the distortion of the culvert section. If the vertical diameter of a pipe culvert is decreased under load it will produce the same effect as settlement.

It long has been standard practice to embed pipe culverts carefully and pack the filling thoroughly on each side. This is done to obtain lateral support as it is economically out of the question to provide culvert pipe of any kind strong enough to carry heavy loads without support from the sides. This lateral resistance is increased materially by the increase in the horizontal axis of the pipe accompanying a decrease

in the vertical axis. With pipes of many types, however, the distortion within elastic limits is slight. In fact, in tests made on concrete and cast iron pipes, at the University of Illinois some years ago, the culverts carried greater loads after cracking than before.

Among the phenomena noted in the tests on corrugated iron pipes described elsewhere in this issue were the material deformations accompanying the application of pressure by means of sand filling. These distortions were usually within elastic limits, the pipes returning to their cylindrical shape when the loads were removed. While not determined conclusively by the tests, it is clear that the increase in the horizontal diameter of these pipes must develop material lateral resistance to crushing from vertical loads. Attention may also be directed at the same time to the corresponding decrease in the vertical diameter which should be instrumental in introducing arch action in the fill as previously explained.

Probably no conditions of load and pressure are more difficult to reproduce artificially under circumstances that will permit of the determination of pressures, than those encountered by a culvert under a high fill. Tests of pressures in grain bins or on pipes in trenches are not applicable to railroad conditions. The tests on corrugated pipes, particularly in the sand boxes, will prove valuable in a further study of the subject because these pipes possess properties materially different from those used in previous experiments and introduce some factors not usually taken into account.

KEEPING A LOOKOUT ON A FOGGY NIGHT

THE most prominent feature of Inspector Belnap's report on the collision at Amherst, Ohio, March 29, in which 27 persons were killed, is his declaration that permitting fast trains to run at normal speed in fog constitutes a "grave menace" to the traveling public; that when signal indications can be seen but a short distance the running of trains at high speed should be prohibited, and that the officers of the road should see that speed is "materially reduced" in foggy weather. These recommendations are in the right direction, but they at once raise the query whether the investigation has really gone to the root of the matter. A correspondent, "Viator Vacuuus," in another column suggests this point, and asks for enlightenment. Another correspondent calls attention to the lack of explicitness in the recommendations. Abnormal speed is objected to, but what is normal speed? More than a short distance should be allowed in which to see signals, but what is a "short distance"? A "material reduction" of speed may mean much or little.

"Viator Vacuuus" assumes, what has been assumed by everybody since block signals were first used, that a clear signal indicates a clear road to the next signal. For that space—from one signal to the next—a fog as thick as lamp black should not affect speed. The engineman has to give up depending on his eyes, in the same way that he does on a crooked road where a ledge of rock shuts off his view absolutely, except for a very few rods ahead. For the contingency of a house or an elephant on the track, the government criticisms might be apposite; but fixed signals are fixed in one place; their location is known.

Keeping a lookout in fog is a delicate matter, difficult to regulate by rule. That the enginemens of the Lake Shore road can manage it with a high degree of success is evidenced by the fact that the road for many years has run large numbers of very fast trains with a high percentage of freedom from collision, and by the testimony of conductors and enginemens at the Amherst hearing to the effect that, as a rule, they do not find it necessary to lose time on account of fog. If the enginemens are constantly alert this is not necessarily the unreasonable situation which the report implies. Three seconds is ample time in which to see and read a signal. A train running at the rate of a mile a minute travels in the

space of three seconds a distance of 264 ft., and fogs which are so dense as not to permit an engineman to see a signal 300 ft. away are very rare. Thus the engineman has ample time in which to see and read the signals, if he is watching for them. Mr. Belnap concludes that Engineman Hess is a competent engineman, and that he was in proper bodily and mental health; so that, in view of the good records of the past, it is by no means certain that inability to see the signals by reason of the fog was the real cause of the trouble at Amherst. Enginemens sometimes get past signals without heeding them when there is no serious obscuration by fog. It is, indeed, usually necessary in such cases to conclude that the explanation given by the engineman is not a truthful one, but the fact remains that there are many such cases. If an engineman fails to see a signal because he turns to speak to the fireman, or for any other reason relaxes his lookout, he has to be very courageous to acknowledge the fact when he faces a lawyer, who may be intending to prosecute him for manslaughter—or even when he faces simply the loss of his job.

In the present case there is no definite evidence on any of the main points. The fireman of the leading train speaks of seeing one signal 300 ft. away and another 200 ft. Engineman Hess speaks of cases where, apparently, while running at full speed, he has been satisfied to see signals only after he got within about 50 ft. of them. Different witnesses vary widely in their estimates of distances at which objects were seen that night. The report affords no information or even any estimate as to whether the fog allowed 100 ft., 300 ft., 500 ft. or what distance, in which to get a view of the signals. Engineman Hess' testimony, so far as it is reported, is mostly set forth in very general terms; and his fireman, according to the report, saw no signals for a distance of six miles. This breakdown of the rule requiring both men to see the signals should be an important feature of the inquiry, but it is not explained, or even touched upon.

If this is all the information that can be had on the fog question, our knowledge is no more satisfactory at the end of the investigation than it was at the beginning, and the question of the engineman's default can be settled only on those general principles which are applicable in all fogs. Reviewing all the evidence, the government investigator expresses the belief that Engineman Hess failed to see the distant signal, about two miles in the rear of the point of collision, and failed also to see the home signal, about $\frac{3}{4}$ mile in the rear. When running at high speed in a dense fog at night, on a straight and level road, with few landmarks, the engineman must locate his signals largely by the element of time. After running from a certain signal, a sufficient length of time to reach the next signal, he must, if he does not see the signal, at once slacken speed; for either he has miscalculated the time, or the signal has been knocked down, blown over or carried off. He has no alternative. Every additional second increases the necessity for stopping, as it increases the likelihood that he has lost his reckoning. As it is known from the confessions of numbers of enginemens (in cases where no harm resulted) that even the runner of a locomotive moving at high speed sometimes lets his mind wander, this explanation—turning the mind to some other subject for a minute or two—will by most railroad men be deemed the most reasonable one for Engineman Hess' failure.

Evidently—if the report gives all of the pertinent testimony—we may draw, once more, the fundamental moral that neglect of apparently small things leads to trouble in larger things; neglect of the rule—often seemingly an unnecessary rule—to require the fireman to call out every signal, led to the missing of a signal at a critical juncture. If a runner replies to this by claiming that the calling rule is an impossible one, he may explain, but he does not excuse himself; for if a rule prescribed for the purpose of safeguarding carloads of passengers cannot be carried out, it is his duty to

protest; a hard duty, no doubt, as he sees it; but nevertheless a duty.

Mr. Belnap calls for more or better efficiency testing, to assure observance of signals. This is right, and necessary, but this particular problem—to make enginemen and firemen co-operate when running in fog at 3 a.m.—is about the hardest one that the efficiency testers have to deal with. In this detail, as in many other features of the engineman's work, the true desideratum is to so cultivate his mind and conscience as to make him voluntarily adopt and adhere to the highest standards. It is impossible to boss the men in the cab; the most definite resource that we have is the assurance that a thorough and persistent course of efficiency testing in lesser matters, where the problem is easier, will tend to improve men in the larger matters; but the process may be pretty slow.

Mr. Belnap's report makes the recommendations concerning limitation of speeds of trains which are noted at the beginning of this article; he suggests efficiency testing; and, finally, he reiterates the recommendation, made on former occasions, that automatic train-control apparatus be used. Something to supplement the human element is declared now to be an "imperative need." If a railroad superintendent is powerless to secure satisfactory vigilance on the engines of fast trains in fog, and if the only answer that railroads can make to questions put to them by a government inspector is to refer to the book of rules, Mr. Belnap's position is logical. At all events, the public generally will be pretty likely to endorse his declaration that "if the railroads are to fulfill their obligations to the traveling public, steps should be taken at once to actively assist in the further development of automatic stop devices."

NEW BOOKS

The Practical Design of Steel Frame Sheds. By Albert S. Spencer. 157 pages, 6 in. by 9 in. Bound in cloth. Illustrated. Published by D. Van Nostrand, New York. Price \$3.50.

This book might be termed a practical rather than a theoretical treatment of steel frame building design. It contains a very complete set of tables for the design of the roof trusses and columns for shed buildings having spans from 40 to 100 ft. In addition to an exposition of the methods of design, two chapters are devoted to external coverings, gutters, roofing, pipes, ventilation, etc. The book is based on English rather than American practice.

Principles of Depreciation. By Earl A. Saliers, Ph.D., instructor in accounting and investments, Yale University. Published by the Ronald Press, New York.

This book deals specifically with depreciation as a factor in valuations. Mr. Saliers points out in his preface that depreciation may be viewed from two standpoints—that of the accountant and that of the engineer. The function of the engineer is to determine what the rate of depreciation is; the accountant, to suggest devices for recording it and for providing replacement funds, that is, for the preservation of capital value. *Principles of Depreciation* deals with the methods of recording depreciation, and while it is necessary to go into rather fine spun theory, this is because of the nature of the subject and not because of the method of treatment. It is no less a practical matter to devise an accurate method of recording facts than it is to determine what the facts are. The valuation engineer who desires either to himself record the facts which he is in the process of determining or who wishes to study understandingly the facts recorded by others in regard to depreciation must have a good basic knowledge of the methods used in making a record of depreciation. The *Principles of Depreciation* gives a clear, comprehensive description and analysis of modern methods.

Letters to the Editor

THE REPORT ON THE AMHERST COLLISION

NEW YORK, N. Y.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In the report of the Interstate Commerce Commission upon the recent New York Central wreck at Amherst, Ohio, I observe that the Commission ascribes wrongful conduct to a management which fails to order the reduction of speed in block signalled territory when a fog or thick weather exists.

What is the reason for this criticism? If signals are in proper working order and are scrupulously obeyed, it is just as safe to run fast in a fog as at any other time. If the rule to stop and investigate a signal in case its indication is doubtful is also complied with, the last possible element of danger seems to be removed. It would therefore appear that on this occasion the effort to criticize the management had overreached itself.

VIATOR VACUUS.

MISLEADING STATISTICS

NASHVILLE, Tenn.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In the 1914 volume of Statistics of Railways in the United States, recently issued by the Interstate Commerce Commission, statement 31, on page 41 shows, for roads in Class I, Southern district

Dividends declared from current income.....	\$5,828,871
Dividends declared from surplus.....	27,498,401
Dividends declared from income and surplus.....	\$33,327,272

The income, profit and loss statement (No. 35, page 54) also shows the foregoing figures, and in addition, "miscellaneous appropriations of income" by those roads, of \$1,213,994.

An examination of the abstracts on the pages following discloses the fact that these miscellaneous appropriations were reported by the following roads:

Louisville & Nashville	\$204,252
Nashville, Chattanooga & St. Louis.....	559,463
Central of Georgia	450,000
Gulf & Ship Island	279
	\$1,213,994

The annual reports of the first three roads show that the amounts in question were credited to

Louisville & Nashville.....	Reserve for doubtful accounts
Nashville, Chattanooga & St. Louis.....	Semi-annual dividend
Central of Georgia	Semi-annual dividend

Thus the statement on page 41, purporting to show the aggregate dividends declared is misleading, in that it omits \$1,009,463 declared by roads in Class I, Southern district.

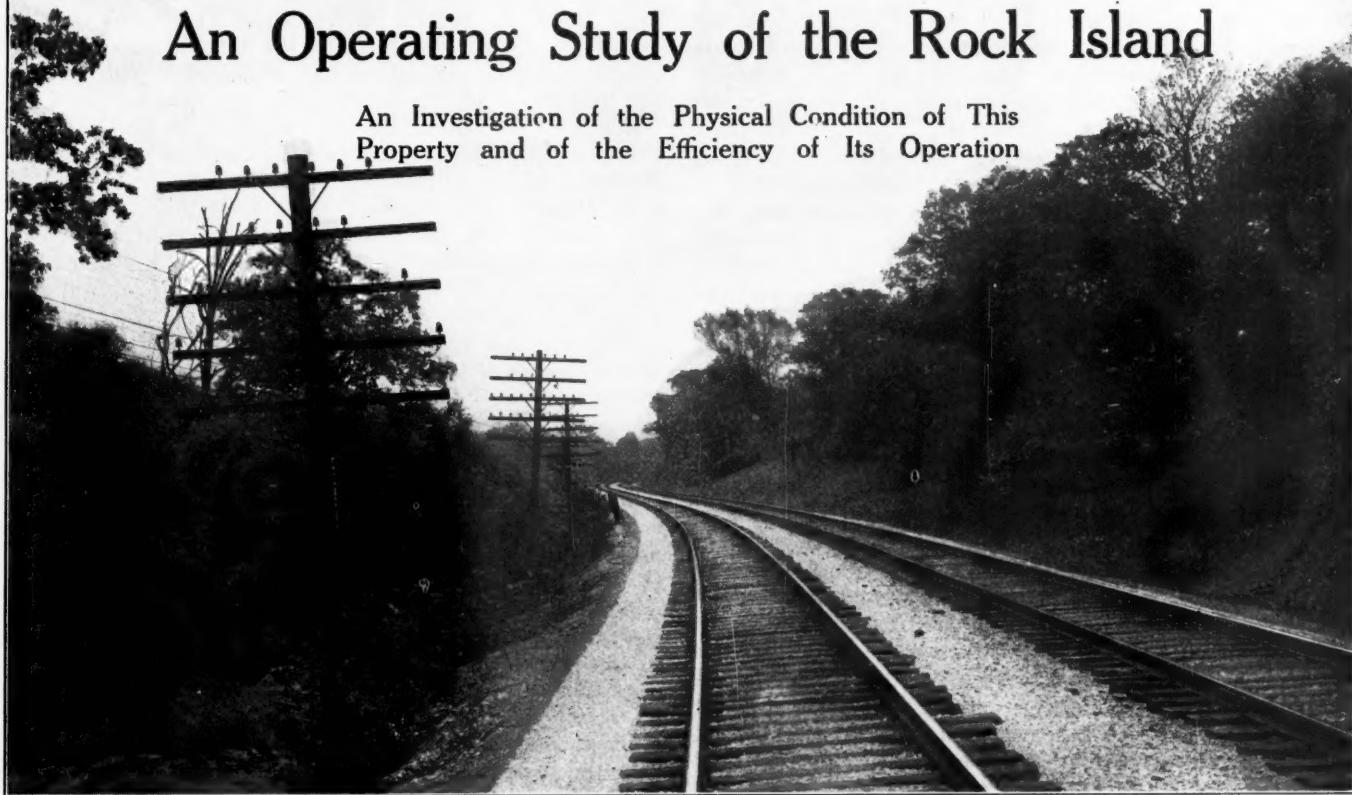
The reason for this, I am informed, is a ruling of the commission's accounting division to the effect that unless dividend appropriations are made within the current year, they must not be reported as "dividend appropriations of income." There being no other classification under which they could be shown, they were, of course, credited to "miscellaneous appropriations," in reports to the commission.

It is difficult for a layman to understand why an appropriation for dividend should not be so designated, even if the formal action was not taken until after the close of the year; so long as it is taken with respect to the current income and before closing the year's business into profit and loss. The commission's accounting department has a difficult problem before it, and is to be commended on its efforts to furnish exact information; but it is to be hoped that in working out the technical details, the main object will not be lost sight of.

J. L. HOPKINS.

An Operating Study of the Rock Island

An Investigation of the Physical Condition of This Property and of the Efficiency of Its Operation



A Section of Track on the Illinois Division.

So much has been written concerning the financial mismanagement of the Chicago, Rock Island & Pacific recently that the general impression has been created that the same conditions have extended through its entire organization, and that the property has been allowed to deteriorate physically to a low level. The *Railway Age Gazette* has not approved the financial methods followed in the administration of this property after the control was acquired by the Reid-Moore syndicate in 1902, and has stated its position in regard to these matters from time to time in these columns. It does not follow, however, that the mistakes in financial management have extended through all departments. For the purpose of ascertaining at first hand the condition of this property and the efficiency with which it is being operated, one of the editors of the *Railway Age Gazette* has made a personal examination of over 3,500 miles of the main and branch lines in the last few weeks and has secured the information on which the following article is based.

Many roads are fortunate in having enjoyed capable and efficient financial and operating managements for many years. Others have had excellent financial but inferior operating organizations, while on still other roads the operating organization has been handicapped by unfavorable limitations resulting from improper financial control. The Rock Island has belonged to the latter class in recent years.

THE PROPERTY

Fundamentally, the Rock Island is a valuable property. It comprises 8,330 miles of line, spread over 14 states west and southwest of Chicago. Main lines extend from Chicago to St. Paul, Minn., Denver, Colo., Santa Rosa, N. M., and Dallas, Tex.; from St. Louis, Mo., to Kansas City and from Memphis, Tenn., to Tucumcari, N. M. It reaches more of the large western traffic centers than any other road. Among these cities are Chicago, St. Paul, Minneapolis, Des Moines, Omaha, St. Louis, Kansas City, Denver, Memphis, Ft. Worth and Dallas. While the lines between Chicago and Kansas City and between Chicago and Denver are considerably longer than those of competing roads, those from

Kansas City to St. Paul-Minneapolis, to Denver and to El Paso and Los Angeles (via its connections west of Santa Rosa, N. M.) are short lines. The line from Kansas City to Ft. Worth is also shorter than that of its principal competitor in the southwest, the Santa Fe, although neither road operates the short line between those points.

Differing from the Burlington, which covers the territory it serves with an intensive branch line development, the Rock Island is spread over a wider area, extending from Minneapolis, Minn., and Watertown, S. D., to Dallas Tex., and Santa Rosa, N. M., while of increasing strategic value as the country builds up and branch lines are thrown out, this extensive development includes a number of main lines which handle a small amount of traffic at present and contribute very little to the prosperity of the system as a whole. Such a line is that from El Reno, Okla., west to Tucumcari, N. M., across Oklahoma and the Pan Handle of Texas. In other instances, these isolated main lines are of doubtful present or future value to the remainder of the system. This is particularly true of the Colorado extension west of Belleville, Kan., and the line from Kansas City to St. Louis, for the possession of these lines prevents the Rock Island from participating in the interchange of considerable business at Omaha and Kansas City which it might otherwise receive. On the other hand, the main lines from Chicago to Dallas, Tex., and to St. Paul and from Memphis, Tenn., to El Reno, Okla., are highly valuable at present, and will contribute in even greater degree to the prosperity of the system as a whole as the territory tributary to them develops.

At a number of important cities as at Chicago, Kansas City and St. Louis it possesses adequate terminal facilities. In addition to owning all of its own facilities at Chicago, it connects with 23 of the roads entering the city and delivers 80 per cent. of its interchange business direct with them. It is also a joint owner of the Belt Railway and the Clearing interchange yard, although this investment was made for the future rather than for the present demands of the Rock Island; and it makes its deliveries only for the smaller roads through Clearing yard at present.

At other points the Rock Island is deficient in terminal

facilities. It is dependent on the Chicago, Milwaukee & St. Paul for facilities at St. Paul and Minneapolis, on the Union Pacific at Omaha, and on the Denver & Rio Grande at Pueblo. It has also been dependent on the St. Louis & San Francisco at Memphis until recently, but has now completed its own freight facilities and is joint owner of a bridge now being built across the Mississippi river which will give it an independent entrance to these facilities.

The Rock Island is also dependent on other lines for entrance into a number of important cities. It enters St. Paul and Minneapolis over the tracks of the St. Paul, it uses the tracks of the Burlington to enter Kansas City from the northeast and those of the Union Pacific from the west and it operates over the Union Pacific into Denver, and over the Denver & Rio Grande into Pueblo. These arrangements are not necessarily disadvantageous in themselves for in several instances the Rock Island is enabled to operate more economically in this way than over an independent line. This is not always true, however, and steps have been taken to terminate several unfavorable trackage agreements since the receivership. That for the use of the Burlington tracks between Kansas City, Mo., and Rushville has already been terminated. Another contract the cancellation of which is under consideration is that providing for the use of the tracks of the Denver & Rio Grande from Colorado Springs into Denver. This contract was made before the Rock Island secured an entrance into Denver over the Union Pacific from Limon, Colo., and has not been used by it in recent years although it is still required to pay nearly \$100,000 per year interest on the investment in this track. Payments have also been discontinued on the deficit of the Trinity & Brazos Valley, owned jointly by the Rock Island and the Colorado & Southern. In this way payments heretofore made on various obligations to the amount of over \$750,000 annually have been terminated since the Rock Island went into receivership. Since July 1, 1915, the Keokuk & Des Moines, 167 miles long, has been operated separately and the Rock Island no longer guarantees the payment of interest on its bonds. The line from Muscatine, Iowa, west to Montezuma, What Cheer and Iowa City, 108 miles long, has also been leased recently to a new company organized to operate this property. In this way the Rock Island is being relieved of a number of unprofitable obligations.

At the close of the fiscal year ending March 31, 1902, the Chicago, Rock Island & Pacific operated 3,910 miles of line. Shortly after this date the company acquired control of the Choctaw, Oklahoma & Gulf, 1,188 miles, the Burlington, Cedar Rapids & Northern, 1,311 miles, the Rock Island & Peoria, 121 miles, and other smaller lines so that on August 1, 1902, the Rock Island system comprised 7,032 miles of line. Since that date the mileage has been increased still further until it now includes 8,330 miles of line, the more recent growth being brought about primarily by the construction of branch lines south of Little Rock, Ark., and at other points, although main lines have been extended from Amarillo, Tex., west to Tucumcari, N. M., and from Kansas City east to St. Louis, while a new line has been added from Allerton, Iowa, through Des Moines to Manly.

For the fiscal year ending March 31, 1902, the gross earnings per mile of line for the Rock Island were \$7,309 as compared with \$7,528 for the Santa Fe, \$6,634 for the Burlington, and \$6,906 for the St. Paul. Immediately following this date the Rock Island absorbed the large mileage of other lines, most of which were branch lines carrying light traffic. As a result the gross earnings per mile of line of the system fell to \$6,091 in 1905 as compared with \$8,233 for the Santa Fe, \$7,437 for the Burlington, and \$7,221 for the St. Paul. For the year ending June 30, 1915, the earnings of the Rock Island increased to \$8,517, as compared with \$10,587 for the Santa Fe, \$9,729 for the Burlington,

and \$9,096 for the St. Paul. Thus while the earnings of the Rock Island per mile of line are about \$1,300 less than the average for the other three roads, the increase since 1905 has been over \$2,400 per mile of line as compared with an average increase of \$2,170 for the other three roads.

While 53 per cent of the Rock Island is branch lines, this does not differ greatly from the ratio on other western roads. A considerable portion of its branch line mileage is, however, located in the southwest where the country is less developed than in Iowa or Kansas and where the traffic secured is correspondingly smaller. Even on the Iowa division which traverses one of the most highly developed agricultural communities on the Rock Island, the 26.4 per cent of branch line mileage requires 12 per cent of the freight train mileage to handle less than 1 per cent of the total freight business of the division.

THE LIMITATION ON ADDITION AND BETTERMENT EXPENDITURES

In view of the normal increase in traffic outlined above it is necessary to look to some cause other than the trend of traffic development for the explanation of the present condition of the Rock Island property. The greatest handicap to its development during recent years and the thing more responsible than any other for its present condition is the provision in the general mortgage of 1902, limiting the issuance of bonds for expenditures for addition and betterment work to \$3,500,000 annually. While there was nothing in this limitation to prevent the financing of improvement work out of earnings, its throttling effect has steadily reduced the amount of surplus earnings available for this purpose. This amount has been further reduced during recent years by the necessity of selling these bonds at a material discount. As a result the Rock Island spent only \$43,474,531, or an average of \$3,300,000, annually for addition and betterment work from April 1, 1902, to June 30, 1915. The provision mentioned has been in force during a period when other railways in the same territory have been making large expenditures for improvements to effect economies in operation and to handle the rapidly increasing business. During the last fiscal year alone the Santa Fe spent for additions and betterments \$7,600,000, the Burlington \$5,740,000, and the St. Paul \$11,500,000.

The insertion of this provision in the general mortgage, specifically limiting the amount of money which could be spent for the improvement of the property, stands out in marked contrast with the provision inserted in the notes issued by the Chesapeake & Ohio in 1914, whereby the road obligated itself to spend \$17,000,000 for additions and betterments in five years, or an average of \$3,400,000 annually on a line of 2,346 miles.

A bond issue of \$3,500,000 annually even if the proceeds should be available without discount, is entirely too small to provide for the addition and betterment work necessary to keep a railway system of 8,330 miles abreast of the requirements made upon it. A large amount of money must be spent from year to year for the ordinary upkeep of a road such as the replacement of rail, the addition of ballast, the rebuilding of stations, the separation of grades, etc., a considerable portion of the charges for which are assigned to additions and betterments rather than to operation. For instance, the average for a period of years shows an annual addition and betterment charge on the Rock Island of \$370,000 for rail and fastenings, \$525,000 for ballast, \$750,000 for the elimination of grade crossings (principally for track elevation in Chicago and Joliet), \$307,000 for station buildings and \$158,000 for fuel and water stations. The result has been that practically all the available funds have been required for small routine improvement work, leaving only occasionally a surplus sufficient to build a small terminal or some other needed facility; and leaving no funds for the re-

duction of grades, the building of second track or large terminals, or the provision of other facilities which, although costing large sums, are absolutely essential to economical operation and yield full returns in decreased transportation costs.

Thus, so far as the major improvements are concerned, the road has been standing still since 1902, while its competitors have been able to withstand the depletion of their revenues resulting from the reductions in freight rates, the enactment of two-cent fare laws and other legislation by making heavy expenditures for improvements which have enabled them to effect large operating economies. This slow starvation has gradually increased the handicap under which the operating department of the Rock Island has been working and is reflected in the continued increase in the operating ratio from 61.6 in 1902 to 75.44 in 1915.

The effect of this handicap on improvement work is indicated by a study of the work of this nature actually done. On March 31, 1902, the Rock Island operated 273 miles of second track and on June 30, 1915, 282 miles. In other

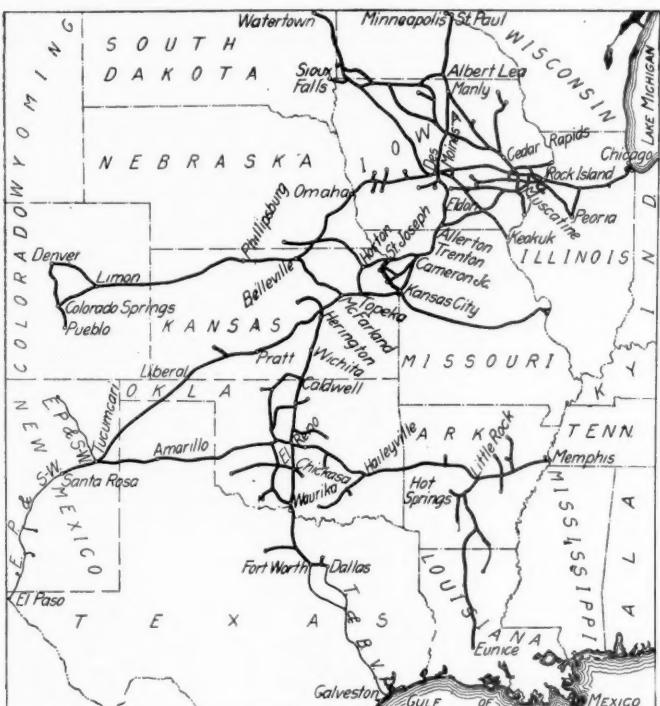
between Allerton, Iowa, and Altamont, Mo. On this district a recent investigation showed 32 trains meeting daily in the 51 miles between Allerton and Trenton, Mo. The restriction of expenditures has affected equally the reduction of grades, no money having been spent for this important work in recent years, although the heavy traffic handled on several divisions will justify large expenditures. As a result the grades on the main line of the Rock Island are considerably heavier than those on the similar lines of its principal competitors. Many of these grades can be reduced readily and at an expenditure small enough to justify it with the traffic now handled. Between Chicago and the Mississippi river the existing 0.6 per cent ruling grade can be reduced to 0.3 per cent at a relatively moderate cost. South of Davenport the ruling grade is 1.2 per cent to Eldon, Iowa, and 1 per cent from that point to Kansas City. Between Davenport and Trenton the grade can be reduced to 0.8 per cent east of Eldon and 0.5 per cent west of Eldon at a moderate expenditure. South of Trenton a 0.3 per cent line can be built into Kansas City, which will not only give the Rock Island a much lower grade than the present route but will avoid the congested line of the Burlington, now used south of Cameron Junction. If this new line is built, not only will all the traffic for Kansas City move over it, but all the through traffic for points south and west of Topeka which is now sent via Horton, Kan., will go this way. It is also probable that the traffic originating at Des Moines or east for Belleville, Kan., and points west will be routed this way to secure the lower grades.

Southwest of Kansas City the ruling grade is 0.3 per cent to McFarland and 0.8 per cent from McFarland to Herington. South of Herington the present ruling grade is 0.7 per cent to the Red river at Terral, Okla. This grade can be reduced to 0.5 per cent all the way from McFarland to Terral at a reasonable cost.

Some of the most favorable opportunities for grade reduction exist on the line between Memphis, Tenn., and El Reno. By the expenditure of \$54,000 to reduce a few minor grades, the ruling grade of 1 per cent between Little Rock and Memphis can be reduced to 0.3 per cent except at one point where the retention of a pusher engine would be necessary. At Haileyville, Okla., a heavy coal traffic originates for movement west to Oklahoma City and El Reno. On the district between Shawnee and El Reno the ruling grade at present is 1 per cent, but surveys have shown that this grade can be reduced to 0.5 per cent at an expenditure of \$600,000 and estimates show a saving of 19 per cent on this investment.

One of the first places where the effect of the restriction of expenditures for improvements is felt is at the freight terminals. Since 1902 a large and complete shop and yard layout have been built at Silvis (Rock Island), Ill., and smaller terminals at Manly, Iowa, Little Rock, Ark., El Reno and Waurika, Okla., and Pratt and Liberal, Kan. However, important as these improvements are, they represent entirely inadequate expenditures for a system of this size for a period of 14 years. As a result terminal facilities are deficient at a number of points, and the lessening of the amounts available for improvements has stopped practically all work of this nature during the last few years.

The conditions at Trenton, Mo., may be cited as typical of those existing at some of the worst points. The terminal at this point has long been inadequate and does not contain a track long enough to hold a tonnage train. Various plans have been prepared from time to time for complete new facilities at this point, but no funds have been available. Finally three or four years ago the construction of a new round house became imperative and it was built in the middle of the old layout. To show the extent to which this lack of terminal facilities has affected the cost of operation, transportation expenses per train mile on the Minnesota division fell from



The Rock Island Lines

words, only 9 miles of second track was added during this 13-year period. In the same interval, the Santa Fe built 846 miles of second track, the Burlington 379 miles, and the St. Paul 742 miles, and the business handled per mile of line increased practically as fast on the Rock Island as on the other three roads.

Practically the only second track in service on the Rock Island today is that between Chicago, Ill., and Iowa City, Iowa, 237 miles, and between Davenport, Iowa, and Muscatine, 27 miles. Second track is needed badly in several places on the system. One place of special congestion is from the end of the Union Pacific joint double track at Topeka, Kan., west to McFarland where the Kansas City-Denver line turns off and on to Herington, Kan., 82 miles west of Topeka, where the Texas and New Mexico lines separate. The congestion of traffic on this section of the line is evidenced by the fact that while the double-track line east of Topeka also handles the Kansas City-Denver business of the Union Pacific, freight trains make over twice as many miles per hour there as between Topeka and Herington. The Missouri division is also badly congested, particularly be-

\$1.20 to \$.97 when the Manly terminal was placed in operation.

While Silvis, Ill., is well located for a system shop for heavy locomotive and car repairs, the other heavy repair shops at Horton, Kan., and at Chickasha and Shawnee, Okla., are not as favorably situated. All of these are old shops which will require replacement before many years. If the projected low grade line is built from Trenton to Kansas City the Horton shops will probably be moved to some point on the main line between Kansas City and Herington, while the Chickasha and Shawnee shops will ultimately be consolidated at El Reno.

Another respect in which the physical plant is inadequate is in passing tracks. On the new lines this deficiency is not so serious as on the older main lines east of Kansas City and on the east end of the Choctaw line in Arkansas. On the Illinois division there are only three passing tracks long enough to hold the 90-car trains operated on this 159 mile engine district between Silvis and Blue Island. As a result a train of this length can be started out of Silvis only at certain hours of the day without suffering serious delays in crossing over the main tracks with part of the train to clear passenger trains.

The inadequacy of track facilities is shown by a comparison of the ratio the mileage of other main, side and yard tracks bears to the mileage of first main tracks. On June 30, 1902, this ratio was 28 per cent for the Rock Island and Burlington, 25 per cent for the Santa Fe, and 22 per cent for the St. Paul, while on June 30, 1915, this ratio was 33 per cent for the Rock Island, 43 per cent for the Burlington, 48 per cent for the Santa Fe, and 44 per cent for the St. Paul. Thus while the proportion of auxiliary tracks on the Rock Island has increased 5 per cent, it has almost doubled on the other roads.

This limitation of addition and betterment charges has led in several instances to the incorporation of separate companies to construct various extensions. In this way the St. Paul & Kansas City Short Line, the Malvern & Camden and other projects were financed. While these lines have been built largely with Rock Island funds, for which bonds were issued, these bonds still remain in the treasury of the road. While these extensions have been justified, if the same amount of money could have been spent for needed improvements along the old line it would have yielded larger returns.

The effect of this restrictive policy on the purchase of equipment has not been so marked, as it has been possible to finance such expenditures in another way. On June 30, 1902, the Rock Island owned 661 locomotives with an average tractive power of 18,015 lb. Thirteen years later it owned 1,675 engines with an average tractive power of 29,431 lb. Likewise on June 30, 1902, the road owned 19,893 wooden freight cars with an average capacity of 24.5 tons, while on June 30, 1915, it owned 17,531 steel or steel underframe, and 26,716 wooden freight cars or a total of 44,247 cars with an average capacity of 37.3 tons. From these figures it will be seen that 68 per cent of the cars purchased since 1902 have been of modern steel or steel underframe construction. This equipment has been further supplemented by the purchase of 4,000 steel frame cars delivered since the close of the last fiscal year. Thus the freight equipment is fairly adequate for the needs of the business, although the amount paid for car hire is still high. In contrast with the lack of heavy expenditures for permanent way improvements this equipment has been financed by the issuance of \$28,520,000 of equipment trust notes since February 1, 1907, \$16,740,000 of which are still outstanding. These notes cover 406 locomotives, 415 passenger, baggage and express cars and 18,560 freight cars.

Thus while the amount of business handled has increased steadily, no adequate amount of money has been available to make needed improvements to effect economies in operation

comparable with those made on competing lines. At the same time the road has been subject to the same adverse conditions of rising wages, increases in taxes, decreasing rates and adverse legislation common to other roads. It is evident from the above that the property needs the expenditure of a considerable amount of money. One estimate indicated that the expenditure of \$90,000,000 would give it a property equal in facilities to any road in the west. In his recent report to the receivers, J. W. Kendrick estimated that the expenditure of \$27,204,000 for improvements would suffice for present needs and, with close economy of operation, would effect a saving in operation of over \$5,000,000 annually. In view of the lack of outlay for heavy improvement work for so many years, it would appear that \$27,204,000 is the minimum amount which should be spent to bring the property up to its proper condition.

THE MAINTENANCE OF THE PROPERTY

So much for the larger improvements. In respect to the maintenance of the existing track, structures and equipment, conditions have been more favorable. Previous to the placing of a road in the hands of a receiver, the physical property is ordinarily allowed to deteriorate seriously, because of the lack of funds or their diversion to other purposes, in order to endeavor to tide over the financial difficulty. As stated above the financial condition of the Rock Island has for a number of years placed a restriction on the amount of money available for the upkeep of the property and the expenditures for maintenance of way have not been as liberal as on some other western roads. At the same time they have not been reduced as much as many suppose, having averaged about \$1,200 per mile of line for recent years. In view of the small mileage of auxiliary tracks, this compares favorably with the expenditures on most roads operating in the same territory and indicates the policy of the operating management of maintaining the existing properties in satisfactory condition rather than adding new facilities where money was not available for both. Because of the limitations on charges to additions and betterments, making a comprehensive improvement program impossible, the money available for maintenance of way has been spent on the track and structures to a very large degree to the exclusion of other desirable but not absolutely necessary work which would involve charges to the additions and betterment account. As a result the track and structures are in much better condition than generally realized and compare favorably with those on other western roads.

Because of the many demands on the funds available for maintenance purposes, it has been necessary to prepare a very careful program of work and to distribute the money accordingly, to maintain and improve the property uniformly. This has led to the discontinuance of the practice of installing screw spikes with 100-lb. rail, and of the construction of creosoted ballast deck trestles on branch lines of light traffic. While both of these forms of construction are excellent in themselves, their adoption on a road limited in financial resources was not considered good practice. To enable track work to be carried on throughout the entire working season with reasonable economy, expenditures for rails and ties are authorized at the beginning of the year and are charged out on the books uniformly for the entire 12 months while the work is done at the most favorable season.

During the last two or three years particularly, the physical condition of the property has been materially improved. While the heaviest rail in service in 1905 was of 80-lb. section, there is now 624 track miles of 100-lb. rail in main line while the 1916 program calls for 202 miles additional. Over 180 track miles were laid last year and this year will see practically all lighter rail out of the track between Chicago and Herington, Kan. Similar improvement is being made in other lines, 90-lb. rail being standard on secondary main lines. Thus this year will see all rail lighter than rerolled

80-lb. section removed from the main line of the Arkansas division.

The Rock Island first began to use treated ties in 1907, since which time over 14,500,000 treated ties have been placed in track. At the present time almost 50 per cent of the ties in track are treated, a proportion considerably above that of most other lines in the same part of the country. As the oldest treated ties have now been in the track only about 8 years, comparatively little benefit has been secured from the increased expenditures on this account up to this time, although the decrease in tie renewals now beginning to be noticed on some divisions should become marked in a few years. All ties for use under rail heavier than 80-lb. are adzed and bored before treatment and tie plates are applied. To use the various classes of treated and untreated ties in those places where they will give the best service, the Rock Island has prepared an unusually complete program of distribution, whereby ties are placed in those lines where they will give the longest life, timber, traffic and climate conditions considered.

While a large proportion of the line has an insufficient depth of ballast, there has been a gradual improvement in both main and branch line conditions in this regard in the last few years. On a number of divisions small gravel pits have been opened and a few cars of ballast taken out and unloaded daily by the local trains. By these and similar measures many lines have been improved without a noticeable effect on maintenance charges until it has become possible to put heavier engines on some lines and to increase the train loads on others. The Louisiana division has increased its train load from 150 tons to 300 tons while at the same time practically eliminating overtime and decreasing the number of derailments. On the Arkansas division the tonnage of time freight trains has been increased 150 tons because of such improvements in track conditions. At the present time 68.5 per cent of the main track is ballasted, of which 1,401 miles, or 18 per cent, is on rock, 743 miles, or 9 per cent, on burnt clay, and 2,640 miles, or 33 per cent, on gravel.

Included in this improvement work has been the rebuilding of a large number of bridges, particularly on the Louisiana division, whereon a considerable mileage the original structures now require renewal. Over 100 creosoted ballast deck trestles were rebuilt on the Arkansas division in 1914 and 84 last year and about the same number of creosoted open deck trestles on the Louisiana division. When the work planned for the present season is done the heavy bridge renewals on these two divisions will be completed for several years.

The Rock Island has a relatively large mileage of automatic block signals in service. On June 30, 1902, there were 19.6 track miles of automatic block signals in use, while on June 30, 1915, there were 1,257 track miles of automatic and 1,087 miles of manual or other block signals. At the present time the main lines from Chicago to Omaha and from Chicago via Kansas City to Herington, Kan., are entirely protected by automatic signals.

Thus, from the standpoint of safety of operation, the track and property are in good physical condition. There are, however, numerous ways in which the expenditure of additional money will result in reductions of maintenance and operating charges, such as the widening of banks, the placing of more ballast under the tracks, the replacement of temporary with permanent bridges, etc.

Similar improvements have been made in the maintenance of equipment, and it is in better condition than for some time previously. Approximately 15 per cent of the locomotives are now being overhauled in the shops regularly. The improvement in the condition of the power has resulted in a decrease in the number of engine failures, and, in connection with better track, has greatly reduced the overtime for train crews.

An important part of the mechanical work has been the making of permanent improvements to cars. Many cars are being rebuilt and heavy repairs made. Coverplates have been applied to over 6,700 cars during the past year, while steel underframes are being added to 250 cars monthly. In the last fiscal year expenditures charged to additions and betterments to equipment account amounted to \$690,000.

OPERATION OF THE ROCK ISLAND

Having outlined the manner in which the track and equipment have been expanded and maintained it is of interest to observe the manner in which the property has been operated. Previous to January 1, 1916, the Rock Island was divided into three operating districts, with headquarters at Des Moines, Iowa, Topeka, Kan., and El Reno, Okla., and with mileages, respectively, of 3,406, 2,179 and 2,257 miles, the lines in Texas being operated under a separate organization incorporated as the Chicago, Rock Island & Gulf, to comply with the laws of that state. On January 1, 1916, the second, or Topeka district was divided between the other two. Each district is in charge of a general manager with broad authority, assisted by a complete staff of transportation, maintenance of way and mechanical officers.

The best measure of the efficiency and economy with which a railway is operated is the size of its train load, due consideration being given, of course, to all conditions. In 1902 the revenue train load of the Rock Island was 178 tons, as compared with 221 tons for the Burlington, 248 tons for the Santa Fe, and 254 tons for the St. Paul. In 1915 the Rock Island had increased its revenue train load to 321 tons, or 79 per cent, while that of the Burlington had been increased to 492 tons or 123 per cent, that of the Santa Fe to 365 tons, or 47 per cent, and that of the St. Paul to 390 tons, or 60 per cent. Thus, while the train load of the Rock Island is considerably below that of these other roads, its ratio of increase for this 13-year period is greater than those of the Santa Fe and the St. Paul, although less than that of the Burlington, which has made a most unusual showing in this respect in recent years. This increase on the Rock Island has been secured with no expenditures for grade reductions, second track or other facilities, while large sums have been spent for these purposes on the other roads. The fact that the Rock Island train load is still considerably below that of the other roads in the same territory shows the opportunity for effecting still further economies by prosecuting a comprehensive improvement program.

One of the most important factors contributing to the increase of train load has been the adoption of heavy motive power on the main line divisions of heavy traffic. The freight locomotive most generally used is a Consolidation engine weighing 172,500 lb., with a tractive power of 39,000 lb. On June 30, 1915, 485 of these engines were in service. The heaviest and most recent addition to the motive power is 75 Mikado locomotives weighing 239,000 lb. with 57,000 lb. tractive power. The first of these Mikado locomotives were secured in June, 1912, and placed on the Cedar Rapids division, where they have made a very favorable record. Since that time they have been employed on a number of other main line divisions.

Before definitely locating them on an engine district very careful studies have been made to determine their suitability for service there. As a result of such a study six of these locomotives have been assigned to the Colorado division where they have made possible the consolidation of trains from Kansas City and Omaha at Belleville or Phillipsburg for movement west and effected a material reduction in train mileage. Likewise, the employment of these Mikado engines on the fixed service or scheduled time freight trains between Des Moines and Rock Island has enabled these trains to handle practically all of the business offered.

On the Illinois division 18 Mikado engines assigned to

drag freight service have helped effect a reduction of 20 per cent in transportation expenses. Comparing the results on this division during the 12 months ending June 30, 1915, when these 18 Mikado engines were in service with those for 12 months previous to their installation, the gross train load eastbound in the direction of prevailing tonnage was increased from 1,200 tons to 1,477 tons, making possible the handling of an *increase* of 22 per cent in tonnage with a *decrease* of 7 per cent in train miles.

No small part of this increase in train loading has been due to the careful supervision exercised by the operating department and to the education of the employees on the importance of this subject. For instance the way freights are given as heavy a train as they can handle and still get over their runs in a reasonable time, frequently hauling considerable through traffic, particularly in the direction of heavy tonnage.

Increased attention has also been given to the making up of trains to enable them to run as far as possible without breaking up or without doing local switching at intermediate stations. Thus trains are run from Fort Worth to Kansas City, and from Memphis to Oklahoma City, El Reno, etc., with relatively little switching en route. In this way they are enabled to handle full tonnage over the entire engine district and the cars are moved more readily.

One problem encountered in the operation of certain divisions which has been overlooked in some instances in studying the operation of the Rock Island is the lack of sufficient business to enable scheduled time freight train to be filled out to full tonnage, while if the schedules of these trains were changed or disregarded, and they were held until full tonnage was secured, most of the business now received would be lost. This condition exists particularly on the Iowa, Colorado and Nebraska divisions and reduces the train load for the entire system materially. Competitive conditions require the operation of three time freight trains daily east of Omaha and two from Omaha to Colorado if the business now received is to be retained. It is, therefore, impossible for the operating department to secure satisfactory train loading on these divisions. The seriousness of the problem is indicated by the fact that in June, 1914, a month of heavy business, the three scheduled and one local freight trains handled all the business offered east of Des Moines, Iowa, with the assistance of six extra trains and that during October, 1914, the month of the heaviest business in the history of the division, only 39 extra trains were required in addition to the fixed service.

This condition led to a somewhat unusual performance being made on the Iowa division for the fiscal year ending June 30, 1915, as compared with the previous year. Owing to these traffic conditions, Mikado locomotives which had been operated experimentally on this division the previous year, were replaced with Consolidation engines, resulting in a decrease of 8.5 per cent in the average tractive power for this division. During the latter year an increase of 11 per cent in traffic, brought about by the heavier grain movement, enabled the trains to be filled out better and gave an *increase* of 5 per cent in train load in spite of this reduction in tractive power. Improvements of this kind combined with more efficient supervision enabled this increase in traffic to be handled with a reduction of \$255,352 in transportation expenses.

As on all roads, the empty car movement pulls down the train loading materially on the Rock Island. This presents a serious problem, especially on the Arkansas and Louisiana divisions. The principal traffic on these divisions is lumber and cotton moving outbound for which empty cars must be sent in. As a result the Rock Island is required to call on its connections at Memphis for a large number of cars for loading, and also to bring cars made empty at Dallas and Fort Worth to this division via El Reno and Little Rock, making necessary an empty haul of 800 miles to secure a

loaded haul of 250 miles to Memphis. Even more serious, however, is the unbalanced traffic which makes it necessary in many instances to haul empty cars in the direction of heaviest traffic.

One departure from general operating practice which is working out very favorably is the running of passenger engines on certain runs over two districts, changing crews at the intermediate terminal. Starting two years ago with the running of engines between Rock Island, Ill., and Trenton, Mo., through Eldon, Ia., to avoid bad terminal conditions at the latter point, this practice has spread until engines are now operated regularly over about ten such combined districts. This same practice has also been extended to time freight trains between Shawnee, Okla., and Booneville, Ark., and between Belleville, Kan., and Goodland. It was also tried with Mikado engines on drag freight trains, but did not work out as well, and has been discontinued.

The adoption of this plan has materially reduced the number of engines required in the different pools. By extending the passenger engine runs from Chickasha, Okla., through Waurika to Dallas, Texas, four engines were released while three were saved by eliminating tieups at Cedar Rapids, Iowa. In addition to the saving in motive power this practice has shown a considerable reduction in the cost of handling an engine every time it is kept out of a terminal. There has also been a material reduction in terminal expense at the intermediate terminals. For instance, the running of passenger engines through Caldwell, Kan., alone has resulted in a reduction of \$385 monthly for labor and \$60 for water.

One of the special campaigns to which the operating department on the Louisiana, Arkansas and Indian Territory divisions has given special attention has been the reduction of claim payments for stock killed along the right of way. On the Southern divisions the amount of money paid out on this account has been excessive, resulting primarily from the attitude of the people living along the line who permit their stock to wander over the railway property and frequently resort to fraud to collect claims. Previous to April 1, 1915, all of these claims were settled in the usual manner by the claim department, but on this date they were turned over to the local divisions officers, who were made responsible for their reduction. A claim adjustor was assigned to each division whose duty it is to examine personally all stock before settling claims and who has authority to settle all claims direct.

The employees have been enlisted in this campaign and much has been accomplished through their cooperation. A bulletin is issued on each division monthly showing the number of head of stock killed by each locomotive engineer and on each section foreman's territory and the value of this stock.

While it has been impossible to secure the enactment and enforcement of state wide herd laws, the road has been able to secure the co-operation of the local public officials in a number of towns along the line in the enforcement of local herd laws within their corporation limits in exchange for improvements, such as the parking of the right of way about the station grounds, etc. At Mansfield, Ark., this co-operation has extended to a point where the local public officers will remove trespassers from trains and give them a seven-day sentence in the town jail if the conductor will advise the city marshal in advance of the train's arrival. At eight or ten points where the enactment of herd laws cannot be secured, local stock herders are employed by the railway whose sole duty is the driving of stock off the right of way within the limits of the unfenced station grounds.

Because of the concentration of these claims in the hands of the local officers of the railway and the measures which have been taken, the number of head of stock killed on the three divisions decreased from 416 in September, 1914, to 186 in September, 1915, and the claims paid from \$10,845 to \$3,086. On the Arkansas division alone for the six months

ending September 30, 1915, the amount of claims paid was reduced \$14,718, or nearly 50 per cent, as compared with the same period of the previous year.

Among other special meetings held to improve operating conditions are district merchandise loading meetings at frequent intervals at which means of increasing car and train loading are discussed by agents, conductors, yard masters and local officials. An annual meeting of employees and officers of the Southern district is also held annually to discuss methods of handling the cotton traffic.

Because of the continued and urgent necessity of keeping down expenses in recent years it has been necessary to keep closely informed as to the costs of the work done. A system of cost records has been developed of more than usual completeness for the use of the officers of the operating department. The most important feature is a monthly detailed analysis of the cost of operation of each division and district as well as of the system, which analysis is prepared in the form of a 40-page booklet of 11-in. by 14-in. sheets. The performance of each division and district is shown for 149 different items in sufficient detail to enable each operating officer to analyze the data for his own territory intelligently. These reports reach the operating officers about the 27th of each month for the previous month. Immediately upon their receipt it is the common practice for the superintendents to discuss them in detail with members of their staffs together with methods for the reduction of their costs in the following month. This close analysis of data brings constantly before the operating officers the importance of operating costs and keeps them on the alert for means to improve their showings. The care with which these reports are studied is evidenced by the frequency with which charges assigned to particular divisions by the auditors are challenged. Each superintendent also has a division accountant in his office who prepares data for him on the cost of all work done on his division.

SUMMARY

In brief the operating ratio of the Rock Island is high—considerably higher than it should be. A detailed study of the operation of the road shows opportunities for economies which should and can be effected. That the management is awake to these possibilities is shown by the reports for the first nine months of the present fiscal year to March 31. While the total operating ratio was not decreased materially because of the heavier expenditures for the maintenance of way and structures, and also of equipment, the ratio of the cost of conducting transportation fell from 40.25 to 36.52. However, the principal cause of the high operating ratio is not the neglect of these important though secondary measures, but the lack of expenditures during the last 14 years for improvements tending to reduce the cost of operation. The present facilities are inadequate for the economical handling of the traffic and no efforts the operating department can make can overcome their deficiencies. Rather, the necessary concentration on the major problem of handling the business under these adverse conditions has tended to prevent those in charge of operation from giving attention to some of the less important measures which might well have been considered.

In addition the low revenue per ton mile received by the Rock Island as compared with competing roads serves to increase the operating ratio, a condition for which the operating department is not responsible. If the Rock Island received the same revenue per ton mile as most of the other roads operating in the same territory its operating ratio would be decreased. This results from the low rates secured and also largely from the fact that on a number of its heaviest traffic lines, as between Chicago and Kansas City, it is a long line and must haul its freight a considerably greater distance to earn the same revenue.

The Rock Island requires the expenditure of a large amount

of money to provide the necessary facilities to handle economically and with profit to itself, the business now received and which would be secured with improved facilities. While the physical condition of the existing property is good a considerable amount of money can also be spent to advantage in adding more ballast and in other work which in turn will result in more economical maintenance of track and structure. Given the money it needs, the Rock Island can become one of the strong railroad properties of the West. Without these expenditures no operating organization can bring it to this position.

ENLARGEMENT OF THE INTERSTATE COMMERCE COMMISSION

The bill to increase the number of members of the Interstate Commerce Commission from 7 to 9, which was passed by the lower house of Congress April 17 has now been favorably reported by the Senate interstate commerce committee. By this act Section 24 of the act to regulate commerce, as now amended, is further amended to read as follows:

"That the Interstate Commerce Commission is hereby enlarged so as to consist of nine members, with terms of seven years, and each shall receive \$10,000 compensation annually. The qualifications of the members and the manner of the payment of their salaries shall be as already provided by law. Such enlargement of the commission shall be accomplished through appointment by the President, by and with the advice and consent of the Senate, of two additional Interstate Commerce Commissioners, one for a term expiring December 31, 1921, and one for a term expiring December 31, 1922. The terms of the present commissioners, or of any successor appointed to fill a vacancy caused by the death or resignation of any of the present commissioners, shall expire as heretofore provided by law. Their successors and the successors of the additional commissioners herein provided for shall be appointed for the full term of seven years, except that any person appointed to fill a vacancy shall be appointed only for the unexpired term of the commissioner whom he shall succeed. Not more than five commissioners shall be appointed from the same political party."

Section seventeen of the Act is amended to read:

"That the commission may conduct its proceedings in such manner as will best conduce to the proper despatch of business and to the ends of justice. The commission shall have an official seal, which shall be judicially noticed. Any member of the commission may administer oaths and affirmations and sign subpoenas. A majority of the commission shall constitute a quorum for the transaction of business, except as may be otherwise herein provided, but no commissioner shall participate in any hearing or proceeding in which he has any pecuniary interest. The commission may, from time to time, make or amend such general rules or orders as may be requisite for the order and regulation of proceedings before it, or before any division of the commission, including forms of notices and the service thereof, which shall conform, as nearly as may be, to those in use in the courts of the United States. Any party may appear before the commission or any division thereof and be heard in person or by attorney. Every vote and official act of the commission, or of any division thereof, shall be entered of record, and its proceedings shall be public upon the request of any party interested."

"The commission is hereby authorized by its order to divide the members thereof into as many divisions as it may deem necessary, which may be changed from time to time. Such divisions shall be denominated, respectively, division one, division two, and so forth. Any commissioner may be assigned to and may serve upon such division or divisions as the commission may direct, and the senior in service of the commissioners constituting any of said divisions shall act as chairman thereof. In case of vacancy in any division, or of

absence or inability to serve thereon of any commissioner thereto assigned, the chairman of the commission, or any commissioner designated by him for that purpose, may temporarily serve on said division until the commission shall otherwise order.

"The commission may by order direct that any of its work, business, or functions arising under this Act, or under any Act amendatory thereof, or supplemental thereto, or under any amendment which may be made to any of said Acts, or under any other Act or joint resolution which has been or may hereafter be approved, or in respect of any matter which has been or may be referred to the commission by Congress or by either branch thereof, be assigned or referred to any of said divisions for action thereon, and may by order at any time amend, modify, supplement, or rescind any such direction. All such orders shall take effect forthwith and remain in effect until otherwise ordered by the commission.

"In conformity with and subject to the order or orders of the commission in the premises, each division so constituted shall have power and authority by a majority thereof to hear and determine, order, certify, report, or otherwise act as to any of said work, business, or functions so assigned or referred to it for action by the commission, and in respect thereof the division shall have all the jurisdiction and powers now or then conferred by law upon the commission, and be subject to the same duties and obligations. Any order, decision, or report made or other action taken by any of said divisions in respect of any matters so assigned or referred to it shall have the same force and effect, and may be made, evidenced, and enforced in the same manner, as if made or taken by the commission as a whole. The secretary and seal of the commission shall be the secretary and seal of each division thereof.

"The salary of the secretary of the commission shall be \$7,500 per annum.

"Nothing in this section contained, or done pursuant thereto, shall be deemed to divest the commission of any of its powers."

BILL TO INCREASE THE NUMBER OF COMMISSIONERS

By W. L. Stoddard

WASHINGTON, May 17.

The Senate interstate commerce committee has ordered a favorable report on the bill to increase the membership of the Interstate Commerce Commission from seven to nine members. The text of this bill is published elsewhere in this issue. The report includes as an appendix the hearing held by the full committee at which Commissioner Edgar E. Clark explained the necessity for the immediate passage of this legislation. Another appendix includes a letter from President Wilson to Chairman Newlands of the Senate committee in which the President comments on the advisability of enacting this measure at an early date.

The one objection which has been urged against the bill was the pendency of Senate resolution 60, calling for a complete study of railroad legislation.

Chairman McChord of the commission called on the President in February and desired to know if the President thought that the passage of the bill in question would be inconsistent with the President's advice to Congress at the beginning of the session to withhold further railway legislation till the inquiry by the special committee. "I told him," the President wrote Senator Newlands, "that it did not seem to me at all inconsistent with that advice and that I was thoroughly in favor of the bill allowing the commission to divide itself into sections, because it was merely administrative improvement, not affecting at all any of the essential matters of legislative improvement. I promised him that I would write you to this effect, and I take advantage of this opportunity to urge very

warmly the immediate consideration of the measure, which, I believe, is already formulated, for conferring this authority on the commission."

Commissioner Clark in his statement showed the tremendous growth of the work of the commission. In 1906, as will be recalled, the membership was increased from five to seven. In 1906 there were on the informal docket 1,002 cases. In 1915 the commission had 6,385 cases on this docket. On the special docket in 1907, the year of its establishment, there were 761 cases. In 1915 this docket had 6,670 cases. On the formal docket in 1906, only 82 cases were disposed of. In 1915 the formal docket numbered 1,378 cases, and "that means," declared Mr. Clark, "cases in which there were contests, full hearings, generally oral arguments and briefs, and printed reports of the commission." In 1910, the year in which the commission was given the authority to suspend proposed increases in rates, there were only 41 such proceedings. In 1915 there were 531 cases of this classification. Again, in 1906, the total number of pages of testimony, supplemented by exhibits, amounted to 28,000. By 1915 this had grown to 202,400 pages.

In addition to these increases in the labors of the commission during the last 10 years, there has fallen on its shoulders the valuation work which is heavy enough to absorb the entire time of a single whole division, or, as Commissioner Clark puts it, "for a small commission acting independently if they have nothing else to think about. . . . If we can not do that the work will all be wasted, and it is costing a great deal of money. . . . It is costing the railroads a good deal of money as well as the government."

At the hearing before the Senate Committee Senator Smith of South Carolina called attention to the suggestion made by another committee of the Senate to send over to the Interstate Commerce Commission for settlement or finding the questions that have arisen as to weight and space in the postal cars. Commissioner Clark called attention to the "not violent assumption" that in the near future there will be some legislation providing for the Federal control of capitalization, a task as big as the task of valuation. Senator Underwood contributed the suggestion that the wage question might be referred to the commission. "I do not see any signs of its being immediately done," he declared, "but it might possibly happen."

INDIAN RAILWAYS.—At the end of the year 1913-14 the mileage of Indian railways open to traffic and under construction or sanctioned was as follows:

	Under construction
	Open or sanctioned
5 ft. 6 in. gage.....	17,641 miles
3 ft. 3 in. gage.....	14,389 miles
2 ft. 6 in. gage.....	2,174 miles
2 ft. gage.....	452 miles
Total	34,656 miles
	2,443 miles

GRAIN TO LIVERPOOL FORTY CENTS.—According to a statement by Dr. E. E. Pratt, chief of the Bureau of Foreign and Domestic Commerce, Washington, the increase in the rate for the transportation of grain to Europe in the last two years has been about 900 per cent and on flour 500 per cent. In January, 1914, the rate on grain from New York to Liverpool was 4.1 cents a bushel; one year later the rate was 18.3 cents; and in January, 1916, it was 40.6 cents a bushel. From both New York and New Orleans the rate on cotton to Liverpool has been increased about 900 per cent. On January 1, 1916, the rate per 100 lb. was \$2.25 from New York and \$3 from New Orleans. The rate on flour in sacks from New York to Liverpool increased in the period between January 1, 1914, and January 1, 1916, from 15 cents per 100 lb. to 90 cents; and from Seattle to Hong Kong from 25 cents to 75 cents.

An Investigation of Corrugated Culverts*

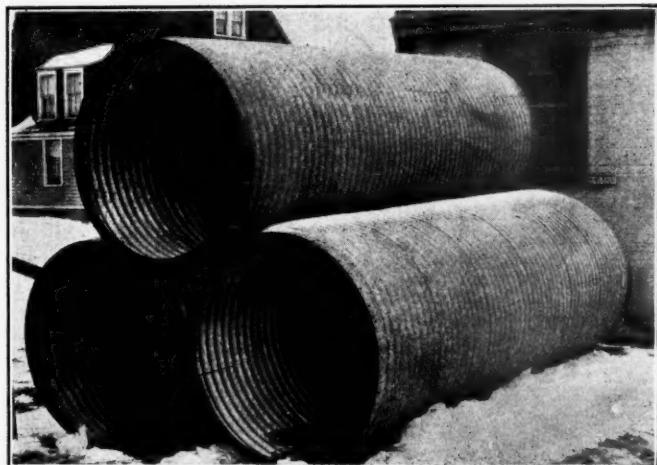
Description of Hydrostatic and Sand Bed Tests Made on Three Sizes of Pipes and the Results Secured

By George L. Fowler

A N extensive investigation has recently been completed to determine the collapsing strength of corrugated culverts made of American ingot iron. (Armco.) Two methods were used in the prosecution of these investigations, one to place the pipes to be tested in a closed cylinder and subject it to an outside hydrostatic pressure until it collapsed, and the other to imbed the pipe in sand and load the surface of the sand until the pipes yielded.

THE HYDROSTATIC TEST.

The pipes investigated were of three internal diameters, 12-in., 24-in. and 48-in. The pipes were further formed of two depths of corrugation, $\frac{1}{2}$ in. and $\frac{3}{4}$ in., with a uniform pitch of $2\frac{2}{3}$ in. They were made up of sheets having a



The 48-in. Pipes Used for the Hydrostatic Tests

length longitudinally of 24 in. and of such a width that but one longitudinal seam was provided in the 12-in. and 24-in. pipes and two in those of 48-in. diameter. The riveting was done throughout with $\frac{3}{8}$ -in. rivets. The rivet pitch on the longitudinal seams was $2\frac{2}{3}$ in. and they were double riveted. On the circumferential seams the rivets were spaced about 8 in. apart. All seams were plain lap seams, with about a 4-in. lap for the longitudinal seams in the larger sizes, 2 in. in the smaller and 2 in. for all the circumferential seams. The sheets and rivets of all pipe were galvanized.

For each diameter of pipe the strength with two depths of corrugation was tested and, for each depth of corrugation the work was done with four thicknesses of metal, 16 gage (.0625 in.); 14 gage (.078 in.); 12 gage (.109 in.) and 10 gage (.141 in.).

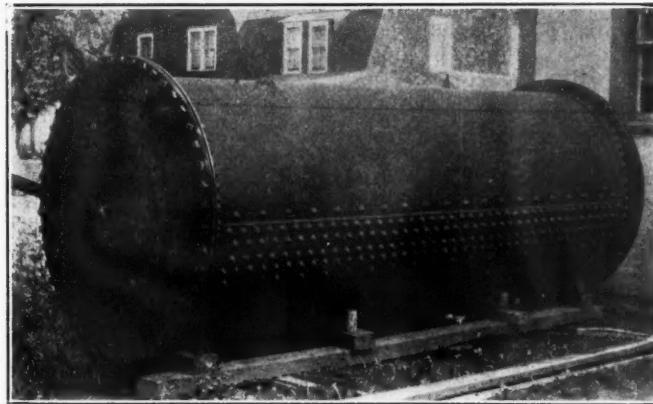
As no data were available upon which to proceed, the first tests were made with pipe 12 in. in diameter and 8 ft. long. This length was selected because, in earlier experiments, D. K. Clark had found, in the determination of the crushing strength of plain cylindrical furnaces, that the influence of end support or bracing did not extend in more than two diameters. Hence it was assumed that a total length of eight diameters would be sufficient to avoid all influence of end bracing and support and this was found to be the case.

Each piece of pipe tested was fitted at each end with an

internally projecting flange made of angles riveted to the inside of the pipe. These flanges were faced off parallel to each other and were drilled for $\frac{1}{2}$ -in. bolts to match the heads of the casings in which they were tested. Before the application of any pressure, the vertical and horizontal diameters at each internal corrugation were measured to within 0.02 in. The same measurements were made at the application of each increment of pressure; the increments varying with the diameter of the pipe, the thickness of metal and the depth of corrugation.

It was characteristic of all of those pipes, that, in yielding, they collapsed suddenly upon the application of the maximum pressure, and that, when following up the collapse by working the pump, it was invariably impossible to attain the maximum pressure again, as was to be expected, because of the weakened condition of the pipe which caused it to continue yielding under a reduced pressure.

The condition of the point of collapse varied with the diameter of the pipe. With those of 12-in. diameter the collapsed portion was usually short, frequently partaking of the nature of a sharp kink, and rarely extending along the pipe for more than 12 in. With the larger pipes this distorted portion became more extended and sometimes ran for several feet especially in the sections of 48-in. diameter. There was, of course, some springing of the pipe before the actual collapse occurred, but it was not of such a character apparently as to weaken it, because a release of the water was not always followed by an immediate fall of pressure,



The Casing Used for the Hydrostatic Tests of the Larger Pipes

the resiliency of the pipe frequently following up the escaping water and maintaining the pressure for some time. At the conclusion of the tests with 12-in. pipe, it was found that the support afforded by the casing did not extend in front of the end more than two diameters and that the distance of the point of maximum deflection or collapse from the end of the pipe was as follows:

$\frac{1}{2}$ -in. corrugation, 16 gage	38 in. = $3\frac{1}{6}$ diams.
$\frac{1}{2}$ -in. corrugation, 14 gage	29 in. = $2\frac{5}{12}$ diams.
$\frac{1}{2}$ -in. corrugation, 12 gage	24 in. = 2 diams.
$\frac{1}{2}$ -in. corrugation, 10 gage	21 in. = $1\frac{3}{4}$ diams.
$\frac{3}{4}$ -in. corrugation, 16 gage	14 in. = $1\frac{1}{6}$ diams.
$\frac{3}{4}$ -in. corrugation, 14 gage	13 in. = $1\frac{1}{12}$ diams.
$\frac{3}{4}$ -in. corrugation, 12 gage	13 in. = $1\frac{1}{12}$ diams.
$\frac{3}{4}$ -in. corrugation, 10 gage	15 in. = $1\frac{1}{4}$ diams.

A careful study of the collapsed portions of the 12-in. pipe

showed that the depth of corrugation was not essentially changed on any having $\frac{1}{2}$ -in. depth of corrugation nor of the No. 14 gage pipe having $\frac{3}{4}$ -in. corrugations, nor was there any apparent change in the pitch. In the case of the No. 12 gage pipe with $\frac{3}{4}$ -in. corrugations the distortion was so great that there was a decided change in the pitch and in the depth of the corrugations. On the bulged side of the pipe, on the other hand, there was a marked change of contour in every case. The depth of the corrugation was greatly decreased and the pitch slightly increased.

As it was concluded that the end support does not influence the strength of the pipe for more than $1\frac{3}{4}$ diameters on an average, it was considered safe to adopt a length of 12 ft. for pipes of 24-in. and 48-in. diameters that were to be tested. Tests were also made of a set of smooth pipes 12-in. in diameter, made up in the same way and of the same thicknesses of metal as the corrugated pipe. The object of this was to obtain a rough comparison between the collapsing strength of corrugated culvert pipes and of smooth pipes of the same material and made in essentially the same manner. Taking the pressures of all the pipes tested and tabulating them for comparison we have the following:

		Corrugated pipe	
Gage of metal	Smooth pipe	$\frac{1}{2}$ -in.	$\frac{3}{4}$ -in.
10.....	130 lb. per sq. in.	450 lb. per sq. in.	630 lb. per sq. in.
12.....	80 lb. per sq. in.	420 lb. per sq. in.	490 lb. per sq. in.
14.....	40 lb. per sq. in.	275 lb. per sq. in.	380 lb. per sq. in.
16.....	37 $\frac{1}{2}$ lb. per sq. in.	225 lb. per sq. in.	360 lb. per sq. in.

This shows that the $\frac{1}{2}$ -in. depth of corrugation increases the strength about $3\frac{1}{2}$ times with 10-gage metal, $5\frac{1}{4}$ times with 12-gage, 7 times with 14-gage and 6 times with 16-gage, a ratio that must be increased by 50 per cent if a comparison is to be made with pipe having a $\frac{3}{4}$ -in. depth of corrugation. It is impossible to state what the increase of strength would be with larger diameters of pipe, but it would probably be quite as great. This can only be determined by further tests, but a rough statement may be made to the effect that a corrugation $\frac{1}{2}$ in. deep will increase the strength of No. 10 gage pipe threefold as compared with smooth pipes of the same material, and that the increase for the other gages will be about in an inverse ratio to the thickness of the metal.

The results obtained in the tests of the three sizes of pipe are given below:

HYDROSTATIC COLLAPSING PRESSURE OF CORRUGATED CULVERT PIPE			
Diameter of pipe	Gage of metal	Depth of corrugation	Collapsing pressure in lb. per sq. in.
12 in.	16	$\frac{1}{2}$ in.	225
12 in.	14	$\frac{1}{2}$ in.	275
12 in.	12	$\frac{1}{2}$ in.	420
12 in.	10	$\frac{1}{2}$ in.	450
12 in.	16	$\frac{3}{4}$ in.	360
12 in.	14	$\frac{3}{4}$ in.	380
12 in.	12	$\frac{3}{4}$ in.	490
12 in.	10	$\frac{3}{4}$ in.	630
24 in.	16	$\frac{1}{2}$ in.	52
24 in.	14	$\frac{1}{2}$ in.	75
24 in.	12	$\frac{1}{2}$ in.	130
24 in.	10	$\frac{1}{2}$ in.	160
24 in.	16	$\frac{3}{4}$ in.	100
24 in.	14	$\frac{3}{4}$ in.	100 (125)
24 in.	12	$\frac{3}{4}$ in.	180
24 in.	10	$\frac{3}{4}$ in.	320
48 in.	16	$\frac{1}{2}$ in.	15
48 in.	14	$\frac{1}{2}$ in.	20
48 in.	12	$\frac{1}{2}$ in.	33
48 in.	10	$\frac{1}{2}$ in.	58
48 in.	16	$\frac{3}{4}$ in.	29
48 in.	14	$\frac{3}{4}$ in.	39
48 in.	12	$\frac{3}{4}$ in.	45
48 in.	10	$\frac{3}{4}$ in.	70

THE SAND BED TESTS.

The sand used was kiln-dried sharp sand, to keep the conditions of the test as uniform as possible.

It was supposed that such sand would arch under a load and be self-supporting to a certain extent, but as no data were available to indicate the extent to which this would occur, some preliminary laboratory tests were made to determine this quality.

The first tests were made with wrought iron pipes of 2-in., 4-in. and 6-in. diameters, respectively 18 in., 16 in. and 21 in. long. Each was fitted with a flange coupling at one end to

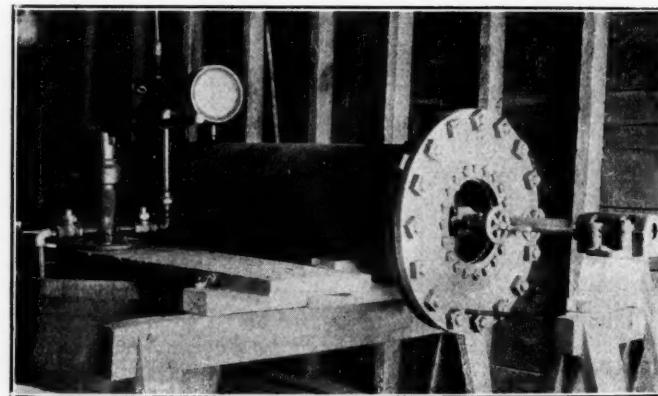
which a similar flange could be bolted. For purposes of the test a sheet of cheap, white, wood pulp writing paper was bolted between the coupling flanges, thus forming a diaphragm closing the pipe. Wooden plungers were provided that fitted loosely in the pipe, by means of which a pressure could be applied to the paper. These and all subsequent pressures were applied in an Olsen testing machine.

The pressure was applied to the paper diaphragms and the amount required to burst them was noted. Then a fresh diaphragm was put in place and covered to a depth of one inch with dried sand. The pressure was again applied and the amount required to burst the paper noted. This was repeated by increasing the depth of sand one inch at a time until the 4-in. and 6-in. pipes were filled and a depth of 9 in. had been attained in the 2-in. pipe. In the following tabulation of the loads required to burst the paper diaphragms, the weights of the wooden plungers and beds of sand are included:

PRESSURE REQUIRED TO BURST PAPER DIAPHRAGMS
Diameter of pipe

Depth of sand	2 in.	4 in.	6 in.
0 in.....	76 lb.	81 lb.	75 lb.
1 in.....	128 lb.	116 lb.	110 lb.
2 in.....	143 lb.	147 lb.	125 lb.
3 in.....	398 lb.	178 lb.	85 lb.
4 in.....	683 lb.	179 lb.	150 lb.
5 in.....	958 lb.	175 lb.	115 lb.
6 in.....	1,718 lb.	240 lb.	125 lb.
7 in.....	4,274 lb.	339 lb.	145 lb.
8 in.....	8,444 lb.	385 lb.	145 lb.
9 in.....	10,294 lb.	388 lb.	250 lb.
10 in.....	...	907 lb.	325 lb.
11 in.....	...	1,477 lb.	270 lb.
12 in.....	...	1,795 lb.	250 lb.
13 in.....	...	1,645 lb.	440 lb.
14 in.....	...	3,933 lb.	380 lb.
15 in.....	...	4,595 lb.	475 lb.
16 in.....	...	4,791 lb.	370 lb.
17 in.....	...	...	985 lb.
18 in.....	...	...	625 lb.
19 in.....	...	...	1,335 lb.
20 in.....	...	...	2,380 lb.
21 in.....	...	...	3,190 lb.

These results have been plotted, as shown in the accompanying diagram for the 4-in. pipe, assuming that a circle

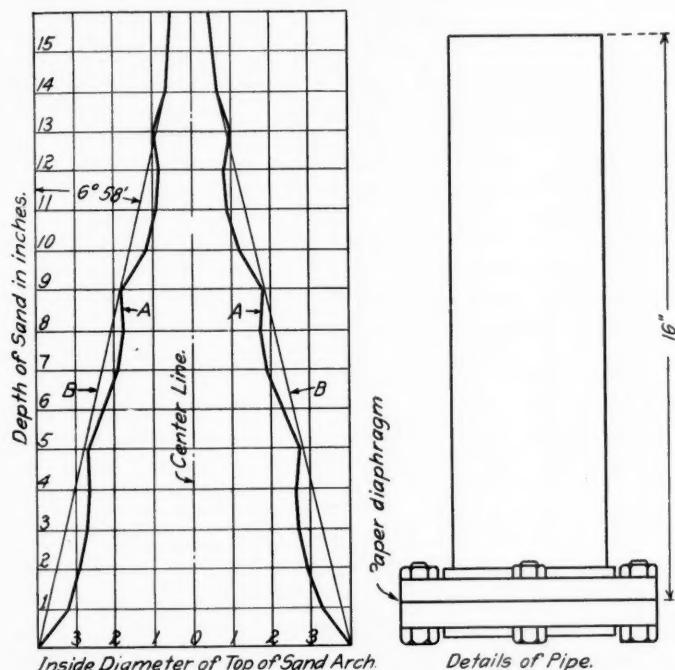


The Casing for Testing the 12-in. Pipes with the Pipe and Caliper in Place

at the center carrying 60 lb. was the pressure transmitted to the paper and the annular space outside of it represented the pressure carried by the arching of the sand. On the diagram the lines B drawn from the ends of the percentage lines at $3\frac{1}{2}$ diameters to the edges of the pipe, are closely coincident with the plotted lines. The angle which the lines B make with the sides of the pipes are: 6 deg. 58 min. for the 6-in. pipe, 6 deg. 57 min. for the 4-in. pipe and 7 deg. 2 min. for the 2-in. pipe, or a total variation of 5 min. This is such a close agreement that it may be regarded as an approximation to the angle of arching sand. It cannot be taken, however, as final, for, if the lines above the $3\frac{1}{2}$ diameters be examined they will be seen to rise on a sharper angle so that it is probable that the true arching line is a curve rather than a straight line.

These investigations were supplemented by the use of a box made for the purpose of experimenting with greater depths and a larger body of sand. This box was 14-in. square on the inside and 45-in. deep. It was made of 2-in. plank firmly bolted together. A hole was cut on one side of the box near the bottom in which a dynamometer was placed. This device was intended to register the lateral thrust of the sand under a superimposed load. A similar dynamometer was laid upon the bottom to register the vertical pressure of the sand.

In these sand box tests the dynamometer resting on the bottom was covered with dry, sharp sand to different depths and a load applied from above through a plunger. The



Details of 4-in. Pipe and Diagram of Bursting Pressures on Paper Diaphragm.

depths ranged from $10\frac{1}{2}$ to 37 in., and the results, as far as bottom pressures were concerned checked very closely with the sand tests made in the pipes already referred to. The bottom pressure decreased with the depth of sand, and yet for any given depth, the ratio of pressure was nearly constant and rose on an approximately straight line, as with the previous tests. The yielding or packing of the sand was very marked throughout the whole work. Under a load of 100,000 lb., there was compression of $3\frac{1}{16}$ in. in a total depth of $39\frac{1}{4}$ in.

With the pressure on the sides there was an entirely different state of affairs. With a depth of $8\frac{1}{4}$ in. above the center of the side dynamometer, there was a steady rise in the lateral thrust as the pressure increased. But when the load was removed from the top, the compacted sand continued to exert its side pressure, and after the depth had been increased and loads were applied there was practically no increase of pressure on the side. In other words, the lateral thrust rose rapidly to its maximum under a comparatively shallow depth of sand, and then remained practically constant for all increases of depth. It appears from this that, on a slightly yielding bottom like that of a dynamometer plate or the top of a corrugated culvert, the sand arches and the bottom is relieved of the load, and that, when the sand is confined, the lateral thrust does not increase, but the vertical load is carried by the frictional resistances of the sand against the side of the box.

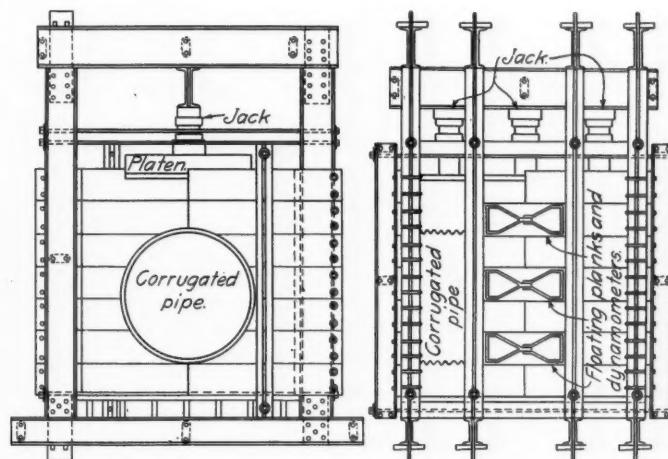
With this data available the box shown in the accompanying drawing was built with a height of 7 ft. and could hold

a pipe 8 ft. long. One side was movable so that any desired width up to 7 ft. could be obtained. Three jacks of 100 tons capacity each were provided to place the load on the sand, which was done by means of three platens 24 in. wide and reaching the full length of the box.

In the prosecution of a test, the movable side of the box was so adjusted that, when the pipe to be tested was in place there would be a foot of sand between it and the sides of the box on each side. Sand was then put into the box and tamped down to a depth of one foot. The pipe was then put in place and the sand rammed about and beneath it and then carried up above the top of the corrugations to a depth of 14 in. This was done to allow the compacting of the sand by the application of the load, and to be sure that there was always a foot of sand at least above the pipe.

The method followed was that used in the hydrostatic tests. After the pipe had been put in place, it was calipered at each corrugation from end to end, for both vertical and horizontal diameters. Then the pressures were applied in varying increments until the vertical diameter of the pipe had been shortened by one inch. In order to gain an idea of the arching properties of the sand and the actual stress to which the pipe was subjected, diaphragm dynamometers were placed on top of the pipe and attached to floating planks in the side of the box.

At each increase of pressure a full set of readings were taken of the vertical and horizontal diameters at each corrugation. At the outset of the work the sand was put into the box to a depth of 3 ft. above the top of the pipe to be tested, and a platen covering the whole length of the box and 36 in. wide used. With this no impression could be made on the pipe and the depth of sand was gradually reduced to 14 in. for the start. Under the load imposed, this bed was reduced to about 12 in. at the end of a test by com-



Part Elevations and Sections of the Sand Box for Testing the Pipes

pacting the flow. It was also found that the platen was too wide to produce an effect on the pipe with the pressure available so that its width was reduced to 24 in., and this was maintained for all of the pipe. At the conclusion of the tests the jacks were carefully calibrated to obtain the actual pressures applied to the platen.

The pipes tested were 8 ft. long, of which 4 in. was taken up by the thickness of the plank at the ends of the box, leaving 7 ft. 8 in. in the clear which was subjected to the sand pressure. The platens had bearing surfaces 7 ft. 6 in. long and 24 in. wide.

All of the work with this sand box emphasized very forcibly the importance of having the material well tamped against the pipe. That the sand flows and transmits its pressure without much delay, was evidenced by the action of the

gages connected with the pressure dynamometers. Here every stroke of the pump could be counted on both the gages measuring vertical loads and those for the lateral thrust. Still in spite of this quick response to pressure, there was a sluggishness in transmitting the pressure through the sand which was shown by the increase of the lateral pressure during the time required to measure the diameters. This usually occupied about 30 min., during which the maximum of the previously applied load was maintained on the sand. It was at this time that there was usually a slight increase of the lateral pressure as well as of that carried on the top of the pipe.

In measuring the pressure on the top of the pipe under a bed of sand from 12 in. to 14 in. thick it was found that, on the 12-in. pipe, it was higher than the average pressure exerted by the platens on the sand. With the 24-in. pipe, it was also higher but only slightly so; while, with the 48-in. pipe it was very much lower. This explanation is offered of the apparent paradox: When the platen was over the 12-in. pipe, it extended for one-quarter of its width beyond the walls of the pipe and was there supported by a deep body of sand capable of yielding considerably under a load. The result was that the greater part of the burden of supporting the load came upon the sand immediately over the pipe and the load per square inch was therefore greater than the load imposed by the platen if it be considered as uniformly distributed. In like manner the better support given to the sand by the 24-in. pipe, cut down the difference between the imposed load, when considered as uniformly distributed, and that on the pipe.

This work, while exhibiting the general features of the conveyance and distribution of the sand pressures, has not been extensive enough to warrant the development of a formula for calculating the pressures exerted under beds of sand. It has been shown, however, that the amount of pressure put upon buried surfaces, with a given load, depends on the depth of sand above it as that pressure decreases with an increase in the depth of the sand. There is not sufficient data to determine what may be the proportional effect of depth of sand on the increase or decrease of pressure.

The lateral pressures, when measured in pounds per square inch were low as compared with the vertical pressures, but no definite ratio could be determined. This difference results from the fact that, with the 12-in. pipe in place, the edges of the platens were within about 13 in. of the sides of the box, but there was a depth of only about 12 in. of sand above the floating plank, whereas, with the larger pipe, the platens were further from the sides.

It was felt that there might be a question in the minds of some engineers as to the action of the culverts under a loading similar to that applied in railway service, where instead of having such an application made through a broad platform covering a considerable area, it was applied through ties of limited width. Accordingly the principal tests were made to determine this point. For this three pipes were taken of 24-in., 36-in., and 48-in. diameter respectively, each having $\frac{1}{2}$ -in. depth of corrugation. The 24-in. pipe was made of No. 14 gage iron and the others of No. 12. The load was applied through 8-in. ties spaced 22 in. between centers by means of jacks bearing on the centers of rails, laid across them to a gage of 4 ft. $8\frac{1}{2}$ in.

For the purposes of the principal tests, wherein it was intended to duplicate railroad conditions as closely as possible, it was assumed that a normal covering was a thickness of sand equal to the diameter of the pipe. As in the case of the 12-in. pipe this condition was realized in the preliminary tests, it was thought unnecessary to duplicate the trials on this size. Under the wooden platen and one foot of sand, the 12-in. pipe of 16-gage metal carried a load of 262,125 lb. before showing a deflection of approximately one inch.

The depth of sand over the pipe was made equal to the

diameter of the pipe for the 24-in. and 36-in. sizes and $3\frac{1}{2}$ ft. for the 48-in., the latter being necessitated by the size of the frame in which the work was done. The difference between the two tests was especially marked in the limitations imposed. With the load applied to broad platens the increase of loading was stopped when the pipe had been deflected approximately one inch, it being quite evident that the platens would carry a greater load. With the load applied on the ties, the increase was stopped automatically by the ties sinking into the sand and thus refusing to carry more. The result was that the distortion of the pipes, under the greatest pressures obtainable, was slight. But this burden was considerably more than that applied to the platens, being 237,800 lb. in the case of the 24-in. pipe.

Had this load been applied on the platen with 12 in. of cover over the pipe, the latter would probably have been very seriously crushed. But under a cover of 24 in. it is also probable that the crushing would not have exceeded that obtained under the ties, because of the arching properties of the sand.

On comparing the loads applied with those of actual railroad service, it will be noted that the maximum static locomotive wheel load is about 70,000 lb. for a pair of driving wheels or about the same as that of the first increment of load used. If this were considered to be increased by running conditions to 100,000 lb., there might result a maximum deflection of the pipe of about 0.45 in. This is a probable maximum, since in the tests under discussion a further increase of the loading served to so distribute the strain as actually to decrease the deflection at the one point of greatest yield under the intermediate loading.

The measurements of the pipe showed that, even after the application of a load of 237,800 lb. with an average deflection of the pipe of 0.14 in., the recovery of the pipe against the burden of sand above it was fully up to its original shape and that it had sprung back to an average shape more nearly round than when first measured.

The point to be emphasized here is the fact that, under the heaviest load that can be applied to the ties of a railway track by the wheels of any existing locomotive or car, a 24-in. corrugated culvert pipe having the depth of corrugation and thickness of metal of the one tested and buried under a cover of 24 in. of dry sand cannot be deflected beyond its elastic properties of complete recovery of its shape when the load is removed.

If we assume the strength of the pipe varies with the thickness of metal, as previously demonstrated, it becomes evident at once that by increasing the thickness to No. 12 or No. 10 gage, the deflection of the pipe under the possible maximum loads would be almost imperceptible.

The tests of the 36-in. and 48-in. pipe corresponded closely with that on the 24-in. On the 36-in. 12-gage pipe, under 3 ft. of sand, a pressure of 165,900 lb. produced a deflection of approximately 0.60 in. and the original form was recovered to a great extent after release. On the 48-in. 12-gage pipe, under $3\frac{1}{2}$ ft. of sand, a pressure of 124,000 lb. caused a deflection of approximately 0.66 in., much of this also being recovered on release of the jacks. From which it seems reasonable to conclude that, under existing railroad loading, corrugated culverts of 36-in. and 48-in. diameter are uncrushable when under a cover equal to their own diameter.

In this connection there is certain corroborative data obtained at the experiments with drain pipe in ditches, conducted by the engineering school of the Iowa State Agricultural College.

On the basis of data afforded by these tests and also of practical experience it is evident that the unusual depth of a ditch in which a corrugated culvert is installed does not involve any especially severe conditions—that indeed such an installation is better protected from superimposed loads than one with a shallower cover. But it should be remem-

bered that the weight of a cover consisting of a wide loose fill or embankment is not so well supported laterally as in a narrow ditch and that thus extremely high embankments may bring about conditions of unusual severity, which should be provided for by the use of heavier gages.

The conclusions that seem warranted by these investigations are that the full collapsing strength of corrugated culverts, as determined by the hydrostatic tests, can probably not be fully realized under an earth covering, because of the impossibility of securing an even pressure upon all sides of the pipe. Under ordinary conditions of loading under a bank or fill, the maximum pressure will be exerted vertically, and the pipe be distorted by a shortening of the vertical and lengthening of the horizontal diameter.

The value of end support extends further from the end of the pipe under an earth load than under a hydrostatic pressure. The greater the depth to which a pipe is buried the less the variation in the loads to which it will be subjected. The maximum pressure upon a pipe is reached under a certain depth of cover, which was not determined. At depths greater than the maximum above referred to, the pressures due to surface loading decrease. The two previous conclusions apply also to lateral pressures.

The 12-in. pipe of No. 10 gage would be practically uncrushable under a cover of dry sand three feet deep. This probably holds for all other granular materials. It is estimated that a depth of cover equal to three times the diameter of the pipe will suffice to protect it from any increase of pressure due to surface loading. There is no data as to the depth of penetration of concentrated surface loads, but it is safe to conclude that the intensity is dissipated as the depth increases.

ANNUAL MEETING OF RAILWAY DEVELOPMENT ASSOCIATION

The tenth annual meeting of the Railway Development Association was held at New Orleans, La., on May 9, 10 and 11. At the opening session Martin Behrman, mayor of New Orleans, delivered an address of welcome.

The business program was then taken up, John C. Emig, president of the association, and industrial agent of the Cleveland, Cincinnati, Chicago & St. Louis, presiding. The first subject for discussion, "Railway Development Work," was presented by J. C. Clair, industrial and immigration commissioner of the Illinois Central. Mr. Clair outlined briefly the importance of all members coming together for the annual meeting, the spirit of good fellowship manifested and the desirability of the exchange of ideas by all present on the development work of the various railroads, covering industrial, agriculture, immigration and publicity. Mr. Clair also spoke of the demonstration farms on the Illinois Central supervised by agriculturists, co-operating with the agricultural colleges, the new co-operative creameries established and the latest advance made by his company, viz., the free distribution of pure bred bulls in the interest of better live stock and dairying. Open discussion followed.

L. J. Bricker, general immigration agent of the Northern Pacific, spoke on "Railway Immigration Work." He said that the great duty of railroads was to keep in touch with settlers before and after securing them, doing missionary work to assure welcome and success.

The subject of "Agriculture and Horticulture in the South" was presented by James A. Hearn, fruit and vegetable agent of the New Orleans & North Eastern, and Dr. W. R. Dodson, dean of the Louisiana State University, spoke on "Diversification," advising the raising of food at home.

Other addresses were delivered by E. M. Williams, vice-president, Southern Express Company; R. W. Cooke, industrial agent, Pennsylvania Lines West; Col. John P. Mayo, immigration commissioner, United States Government, New

Orleans; Austin Galleher, industrial agent Baltimore & Ohio; George Bates, industrial agent, Delaware & Hudson; Mr. and Mrs. H. B. Fullerton, of the Long Island; D. E. Willard, of the Northern Pacific; D. C. Welty, of the St. Louis, Iron Mountain & Southern; G. E. Cassel, of the Norfolk & Western; Walter V. Powell, of the St. Louis Southwestern; T. A. Hoverstad, of the Minneapolis, St. Paul & Sault Ste. Marie, and H. M. Mayo, of the Southern Pacific. Members of the association participated in the open discussion following each address.

The regular informal banquet was held at the St. Charles Hotel on the evening of May 10. The following were the speakers: Thomas C. Powell, vice-president, Cincinnati, New Orleans & Texas Pacific; J. W. Kearney, manager of publicity, Missouri Pacific-Iron Mountain System; Dr. W. R. Dodson, Dean of the Louisiana State University, and Charles W. Holman, secretary National Agricultural Organization Society. Walter Parker, general manager of the New Orleans Chamber of Commerce, presided as toastmaster.

This was the most representative meeting ever held by the association. The semi-annual meeting will be held in Chicago in November and the next annual meeting will go to Louisville in May, 1917.

The new officers elected for 1916 were: President, L. J. Bricker, general immigration agent, northern Pacific, St. Paul, Minn.; first vice-president, R. W. Cooke, industrial agent, Pennsylvania Lines West, Pittsburgh, Pa.; second vice-president, H. O. Hartzell, assistant general industrial agent, Baltimore & Ohio, Baltimore, Md.; secretary and treasurer, D. C. Welty, commissioner of agriculture, St. Louis, Iron Mountain & Southern.

Mr. Powell in his address discussed the work of the marketing department, saying in part:

"There are many agencies at work in the interest of the farmer, because it is recognized that the wealth of the country is based upon the products of the soil. In my opinion, there is no more important medium operating in the farmer's interest than the marketing branch of the development department.

"The sole purpose of a railroad is to transport passengers and freight with safety and reasonable dispatch, but preceding the transportation must come the marketing, or plan of distribution. Until the product of the factory or soil is successfully marketed the product is a drug on the market and a menace to the value of future production. Failure to market is a tragedy and may bring suffering and want to both the producer and would-be consumer.

"An industry should not be located at a point where the chances are against its success. A farmer located on a branch road should not be persuaded to raise perishable products based upon the expectation of receiving fast freight or express service when such service is impossible owing to his location. Experimental crops should be avoided, except where they are known to be distinctly experimental and where failure will not mean serious embarrassment.

"The marketing department should be held responsible in the matter of quantity and in the method of packing. Crops of whatever character should be raised in *sufficient* quantities to be marketable. This does not mean invariably that the crops must be raised in *large* quantities, but the market agent and the agricultural agent working together should develop the possibility of a market before the crop is planted. They should also be in touch with the probable crops, so that the shipper may be advised as to the best method of packing and preparing his stuff for market. A small amount of carelessness in grading potatoes, for instance, may mean a substantial difference in the price.

"The special duty of the marketing department should be to guard against disappointment on the part of the producer, who has ventured beyond into new fields on the advice of the marketing and agricultural departments."

WILLIAM A. GARDNER

No greater wave of sorrow ever swept over the hearts of the railway men of the United States than that set in motion by the news of the death of William A. Gardner, president of the Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha railways, at his summer home in Osterville, Mass., on Cape Cod, on May 11. Mr. Gardner's demise marked the passing of one of the most interesting and engaging personalities among the business leaders of the country, and one of the most public-spirited and able railway executives of the time.

For those who knew him and his work well, his untimely death was a pathetic tragedy. It was a tragedy not only because of the long period of decline and suffering through which he had to go before death claimed him, but because his life was terminated before he had had opportunity to achieve all that he could have achieved if fullness of years had been granted to him. Those who knew him and his work well placed him in the front rank of the great railway and business managers of the country. His persistent modesty in avoiding publicity for himself, and always influencing his friends, and especially his newspaper friends, to give to others most or all of the credit for achievements for which they knew that he deserved most of the credit, prevented him from securing the public reputation and recognition to which he was entitled.

The tendency that he always showed to efface himself and avoid publicity found its counterpart in the more than Spartan heroism he manifested during the decline in his health, which had been going on for a long time. His friends and business associates had been observing with profound concern for months that physically he was losing ground. Nevertheless, because he remained at his post and continued his work his death came as a shock even to most of those who had seen him frequently. He would never admit his true condition. He had had heart trouble for some years, and as time went on this, under the stress of his work, became more serious. Some of his associates, suspecting the true situation, entreated him months ago to take a long rest. He smilingly and kindly repulsed them. His condition for some time had been so bad that he was almost unable to sleep, but by the exercise of a will and fortitude almost unequalled, he went on performing his regular official duties, and at the same time attending conferences and rendering services to his friends and to the public which would have taxed his strength even when in good health. Apparently, while realizing the probable result, he had heroically resolved to "play the game" to the end.

Mr. Gardner united in a very extraordinary degree great talents with an attractive and lovable personality. He had a wide acquaintanceship among men in all the walks of life; and he was so genial, kindly, generous, democratic and

magnetic that it can be said of him as truly as of any man that ever lived, that he was universally beloved. He had an unusually keen sense of humor, and a remarkable gift for witty repartee; and he was always indulging in badinage at the expense of his friends; but he was incapable, except under great provocation, of saying anything that would wound any one's feelings. He was so accessible and his sympathies were so broad that he was constantly giving time and thought to the problems of people who went to him for counsel and advice; and nobody ever went to him on such a mission without coming away feeling better, more self-respecting and more hopeful.

It is hardly necessary to say what the home life of such a man was like. He could hardly have failed to be what he was—at once the support, comfort, play fellow and hero of his family.

Like many other leading railway men, Mr. Gardner entered the service very young. He may almost be said to have had no boyhood, since he became a telegraph operator when only 15 years old. He was in the service of the North Western almost 40 years. The outstanding feature of the management and operation of this road has been its consistent policy of giving the best practicable service to its patrons. It has been profitably managed, but when it has had to choose between economy and service it has never sacrificed the latter to the former. Mr. Gardner's qualities of mind and character pre-eminently fitted him to rise on a railway on which this policy prevailed. He never forgot that his first duty as a business man was to do the best work he could for the railway, and that the first duty of the railway was to give the best service it could to the public. It has been largely owing to his personality and work that the North Western, during a period when the railways generally have been unpopular, has enjoyed unusual popularity

with its patrons, and especially with the traveling public. From the time when he rose to important positions in the operating department, he was an important asset in securing business. He spared no effort to give good service, and his wide acquaintanceship and personality attracted no small amount of business.

One of the most difficult problems with which the railway managements have had to deal in recent years has been that of maintaining satisfactory relations with their employees. Mr. Gardner had come up from the ranks. He had a wide acquaintanceship from all classes of employees. He had many personal friends among them, and was democratic in dealing with all of them. They had confidence in his fairness, and in consequence of his kind and diplomatic methods in dealing with them the North Western has for years had almost no serious labor troubles.

It was on the North Western, and under Mr. Gardner's administration, that the "Safety First" movement on railways originated. The real father of it was R. C. Richards,



W. A. Gardner

general claim agent, but he received the cordial support and encouragement of Mr. Gardner and other officers of the road, and in consequence the movement on the North Western was very successful, and it spread to other railways throughout the country. There was some question when it was begun as to whether the management would be able to secure the cordial co-operation of the employees. This was done and probably it helped the managements of other railways to secure similar co-operation.

As a railway executive, Mr. Gardner was one of the hardest working men in the country. He kept familiar with every detail of the management and operation of the property, and his influence was felt in every department. He was not a driver, but a leader of men, and no railway executive received more loyal and energetic support from his staff.

When the period of railway regulation began he was one of the first to recognize that times had changed; that the old abuses in railway management must be eradicated and that the managers must recognize, not only in what they said, but in what they did, that the railways rendered a public service, and that the public had a right to have something to say about the way the service should be rendered and the rates that should be charged for it.

He was active in many ways in trying to bring about better relations between the railways and the public. He was a member of many civic organizations, and served in official positions in not a few of them. He was at one time president of the Industrial Club of Chicago, and he served on the Committee of Investigation on Smoke Abatement and Electrification of Railway Terminals of the Chicago Association of Commerce.

He exercised a strong influence in bringing about co-operation between the various railways and was chairman of the Western Group of the Railroad Presidents' Committee on Federal Valuation of Railways, and a member of the executive committee of the Bureau of Railway Economics. He was averse to being quoted in newspaper interviews or to making public addresses, but he did make such addresses occasionally, and they were always instructive, entertaining and witty to a degree. He appeared as a witness on behalf of the railways in several important rate cases, and his broad knowledge of railway problems and gift for concise and illuminating statement of facts and principles made him a very valuable and important witness.

Mr. Gardner was 57 years of age and was born at Gardner, Ill. He entered railway service in 1872 as a telegraph operator for the Chicago & Alton at Lemont, Ill., and he entered the service of the Chicago & North Western in 1878. Until 1885 he was clerk and operator in the office of the superintendent of the Wisconsin division. From 1885 to 1890 he was assistant superintendent of the same division and from 1890 to October 1, 1896, superintendent of the Wisconsin division. On October 1, 1896, he was appointed assistant general superintendent, which position he held until November 30, 1899. He was then general manager until January 23, 1906, when he was elected vice-president in charge of operation and maintenance. On October 18, 1907, he was also elected president of the Chicago, St. Paul, Minneapolis & Omaha, and on October 20, 1910, he was elected president of the Chicago & North Western, succeeding Marvin Huggett.

Mr. Gardner is survived by a widow and four daughters: Mrs. James Lawrence, Onderdonk; Mrs. Charlotte McCall, Miss Willamine and Miss Ancinette Gardner.

NEW RAILWAY IN INDIA.—The Indian railway board has sanctioned a survey of a 2 ft. 6 in. gage line to be constructed from Charkardarpur to Jaintgarb via Chaibassa, a distance of 54 miles.

HISTORIC EVENT AT CLEVELAND STATION

By Ward W. Adair

Railroad Secretary, Y. M. C. A., New York

Perhaps the most picturesque meeting of the recent international convention of the Young Men's Christian Associations at Cleveland was the celebration, by the railroad division, on May 14, 1916, of the founding of the work among railroad men on the exact spot in the Cleveland union station where the first room was set aside for the use of the railroad department 44 years ago.

A line of march formed in front of the Statler Hotel, headed by the noted New York Central band of Jersey Shore, Pa. Some five hundred men were in line and as they went through the city to the stirring strains of "Onward Christian Soldiers" and "How Firm A Foundation" the populace gathered on the sidewalk and applauded heartily. The leaders carried "Old Glory" at the head of the procession and a delegation carried a banner on which was inscribed, "Commemorative Service of Railroad Men, Observing the Founding of the Railroad Y. M. C. A. at Union Station, April 11, 1872."

Arriving at the station, the meeting was called to order by Edwin L. Hamilton, who, in point of service, is the senior railroad secretary of the International Committee. The meeting was under the auspices of the "Quarter Century Club" composed of members and secretaries who have seen twenty-five years continuous service with the railroad branch. Frank H. Thatcher, railroad secretary at Buffalo, read an impressive scripture lesson and Melvin W. Callender, railroad secretary at Pittsburgh, offered prayer. The Lackawanna Railroad Association Glee Club sang "Sail On."

Then came the first interesting touch with the past when H. A. Sherwin, chairman of the original Railroad Association, spoke on "The Days of 1872." Mr. Sherwin's address was full of thrilling interest as he recounted the incident of the first meeting when it was definitely determined to organize the new movement. The Cleveland Association at that time desired to re-elect him as president, but declining the greater office, he requested the honor of being the first chairman of the railroad movement and it was accorded him.

W. A. Waggoner, railroad secretary at Atlanta continuously for the last quarter of a century, spoke on "Recollections of an Early Visitor." He told of the inspiration that came to him as a young railroad secretary from frequent visits that he made to the original Association.

Grand Chief Warren S. Stone of the Brotherhood of Locomotive Engineers then gave a telling address on "A Great Movement." Mr. Stone paid a fine tribute to the Railroad Association work in its effort to provide a wholesome and homelike place for railroad men at the far end of their runs.

Mr. Stone was followed by Clarence J. Hicks of The Colorado Fuel & Iron Company, who for more than twenty years was senior secretary of the railroad work and who pioneered the organization on many of the principal lines of the country. Mr. Hicks spoke on the topic, "An Organization That Has Made Good." He found the secret of success in the fact that the Association had been loyal to its fundamental religious principles and that it had yoked up with the great Y. M. C. A. movement, thus finding leaders and prestige.

Dr. John P. Munn, chairman of the International Railroad Committee, spoke on "The Railroad Association of Today." He was followed by John F. Moore, senior railroad secretary, who sounded a prophetic note on "The Railroad Association of the Future."

Led by the band and the glee club, the meeting closed with the singing of "America" while the waiting passengers in the station crowded around with the group and helped to swell the chorus. The benediction was pronounced by Rev. Harry Nyce of Peru, Ind., who as a boy attended the services of the original railroad association in the company of his parents.

REPORT ON AMHERST COLLISION

The Interstate Commerce Commission has issued a report of 39 pages, dated April 25, and signed by H. W. Belnap, chief of the division of safety, on the rear collision of passenger trains which occurred on the New York Central near Amherst, Ohio, March 29, when 27 persons were killed and 47 were injured. The principal facts of this collision were reported in the *Railway Age Gazette*, April 7, page 787, and we note here only certain details, not brought out in the earlier account, with the conclusions of the investigator. The report contains a diagram of the tracks, a perspective view of one of the signals and photographs of wrecked engines and cars. The point of collision was 700 ft. in the rear of the home signal at which the leading train, First 86, had been unnecessarily stopped, and 4,749 ft. in advance of the home signal in the rear; the one which had been wrongfully passed by the second train, Second 86. As before stated, most of the victims who were killed, the passengers in the rear car of First 86, were probably not killed by the collision, but because of the wrecking of the superstructure of this car by the westbound train. It appears that Second 86 was running about 50 miles an hour and the westbound train about 50 or 60 miles an hour. The westbound ran about 700 ft. after striking the obstruction on its track, and in this course overturned several of the cars in Second 86.

The rule quoted in the report in connection with recommendations concerning the running of trains in fog, reads: "551.—Enginemen are specially cautioned if any difficulty with machinery temporarily withdraws attention from constant lookout ahead, or weather conditions make observation of signals or warnings in any way doubtful, that they must at once so regulate speed as to make train progress entirely safe." Engineman Leonard of First 86 said that on that morning he could see signals only about 200 ft. His fireman said that one signal was visible at 300 ft. and another was visible at 200 ft. The flagman of this train thought that he had got back about 10 car lengths when the second train passed him; the conductor thought that the flagman had got back not more than 1½ car lengths.

Engineman W. H. Hess of Second 86 said that he had first encountered fog at Huron about 20 miles west of Amherst, and that it increased as he proceeded eastward. Approaching Amherst there were two or three signals that he could not see until the pilot of his engine was abreast of them. The fireman of this train said that approaching Amherst he was lost and did not know within a mile or two where he was, but he declared that the engineman called to him each signal, "white" as it was passed.

General Superintendent A. S. Ingalls testified at length concerning discipline and other matters. The enginemen not only had been carefully instructed, but had been called into the office, one by one, for the purpose of talking over seriously the matter of safety. They were told that the presence of snow, sleet or fog must never be used as an excuse for not observing signals. The older men had promised, as opportunity offered, to counsel with the younger men in lodge meetings and elsewhere on questions of safety. Efficiency tests had been made with reasonable frequency, "preferably every 60 days." Flagmen are instructed not only in the rules, but also by means of special instruction with respect to different situations. Torpedoes are seldom used; but in a case like the Amherst wreck, when it is known that all tracks will be blocked for some time, torpedoes are used. He considered the indiscriminate use of torpedoes in automatic signal territory to be an element of danger rather than of safety; "where there are many trains, making a great many stops, and where the engineman gets an automatic signal showing the track to be clear and he knows it to be clear and he then runs over torpedoes, he soon begins to pay no attention to them." Mr. Ingalls thought that in this instance the flagman had complied literally with the rules. He pre-

sented a report of 1,203 efficiency tests, made in a period of two years, in which 12 enginemen failed to meet all the requirements of the rules. During the same length of time there were 12 instances of overrun signals.

The inspector concludes that probably the fusee thrown off by the flagman of First 86 approaching Amherst, had entirely burned out before Second 86 reached it. The conclusion is reached that all apparatus was in good condition and it is held to be probable that the towerman was in error regarding the operation of the indicator in the tower, which he had said was in the horizontal position just prior to the clearing of signal No. 40 the second time.

Engineman Hess is 49 years of age, and has been an engineman since 1892. The "more serious entries" against his record are noted in the report, five of them. The last one was in December, 1915, when he was suspended 10 days for striking the rear end of a passenger train at Toledo station, and the last two preceding, in 1910 and in 1908, were for running past block signals; how far past is not stated. He is held to be an experienced and competent engineman; had had adequate rest; was in the best of health and his mind was free from worry. Continuing, the inspector says:

"It is apparent that the provisions of rule 551 were not observed, and the high rate of speed at which train Second 86 was running, in view of the fog and the short distance at which signal indications could be distinguished, was one of the proximate causes of this accident. If Engineman Hess had been running his train at reduced speed, as is evidently contemplated by rule 551, instead of running at normal speed, and even making up time, in all probability he would have been able to read the signal indications properly and this accident would have been averted. . . . All three of the fast trains involved in this accident made up time during the night, and the testimony of practically all of the employees clearly indicates that foggy weather makes no difference in respect to the rate of speed at which trains are run. It is clearly shown, also, that the operating officers . . . were perfectly familiar with the fact that trains make up time in dense fogs. The practice of permitting fast trains to run at normal speed under such conditions constitutes a grave menace to the traveling public. . . .

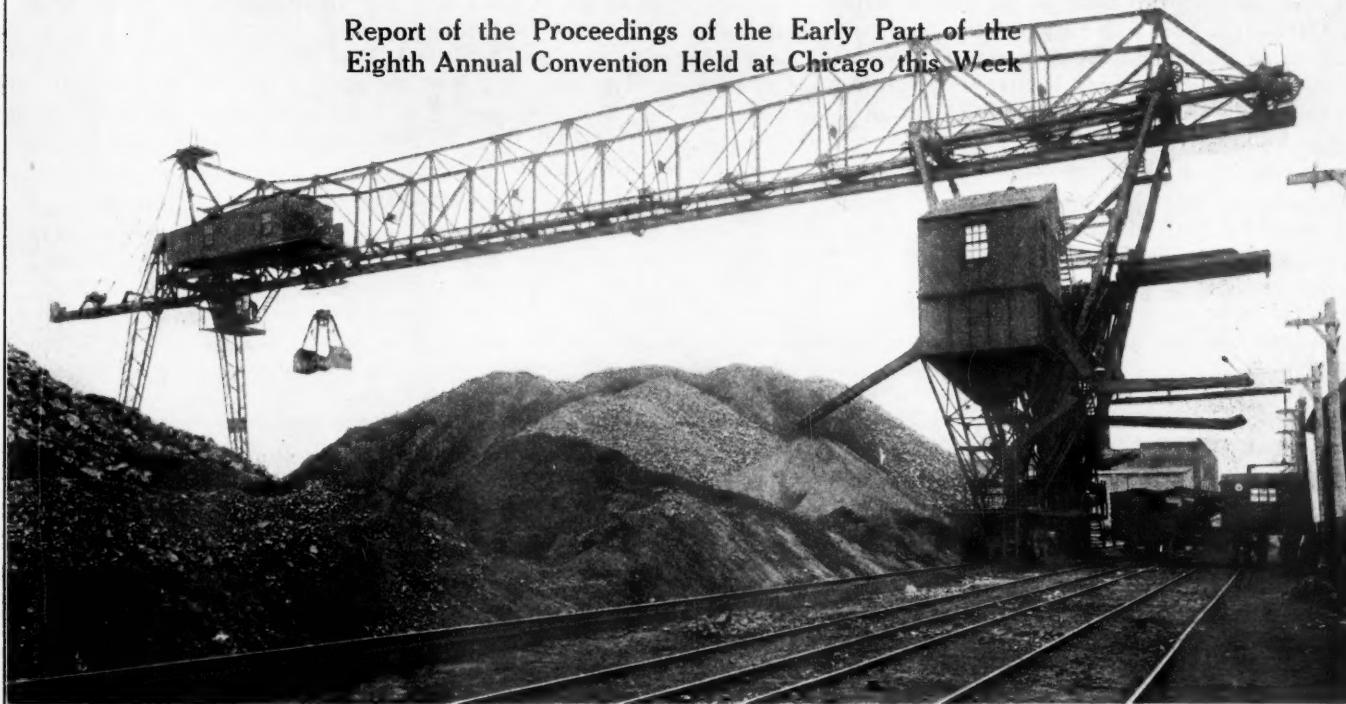
"During foggy or stormy weather, when signal indications can be seen but a short distance, positive and definite instructions should be given prohibiting the running of trains at high speed. Accidents such as this may be expected to occur unless those in charge of the operation of this property at once take steps to see to it, by such check, observations, and other means as may be found necessary, that speed is materially reduced in foggy weather. . . .

"This accident again directs attention to the fact that competent and experienced enginemen are not infallible, and that even a modern and complete block-signal system does not afford absolute protection against disastrous collisions. . . . When trains are operated at high speed while the weather is so thick and foggy that signals can be seen a distance of only a few feet, no system of roadside signals can provide that measure of protection to which the traveling public is entitled. The number of serious collisions which have occurred within the past five years, due to enginemen failing to observe and obey roadside signal indications, demonstrates how imperative is the need of some device that will supplement the human element and assume control of the train in case the engineman fails properly to control his train."

The report goes on to say that automatic stop devices cannot be fully developed by private enterprise to meet all of the exacting requirements, and that as some devices already have been brought to a comparatively high state of practical development, the railroads, if they are to fulfill their obligations to the public, should take steps at once to avail themselves of these devices and actively assist in their further development.

International Railway Fuel Association

Report of the Proceedings of the Early Part of the
Eighth Annual Convention Held at Chicago this Week



THE eighth annual convention of the International Railway Fuel Association was held in the Hotel Sherman, Chicago, May 15 to 18, D. C. Buell of the Union Pacific, presiding. The convention was opened with prayer by Rev. Joseph A. Milburn.

PRESIDENT'S ADDRESS

Mr. Buell said in part: A survey of activities along fuel lines during the past year discloses several noticeable achievements, among which are the development of fuel economy devices, the excellent results obtained by a number of roads in the economical use of fuel and the completion and publication of the Report of the Chicago Association of Commerce Committee on Smoke Abatement and Electrification of Railway Terminals in which it was shown that the steam locomotive was a minor offender among the list of smoke producers. Among the important things yet to be accomplished in order to further improve the fuel service of our railroads may be mentioned:

First: The perfection and adoption of devices or schemes whereby an accurate check can be made on the amount of coal delivered to a locomotive and used during a trip.

Second: The working out of a practical plan for simple, accurate daily reports showing the economy or lack of economy with which fuel is being used, so that prompt action can be taken by those responsible for its use.

Third: The development and adoption of C O₂ recorders for use on locomotives.

Fourth: A reduction in the amount of fuel consumed by locomotives while at terminals. The possibility of running locomotives over more than one division may be worthy of careful reconsideration.

Fifth: A more careful review of the use of fuel for other than locomotive purposes. Approximately one-twelfth of a railroad's fuel bill is for coal used in this way.

Sixth: The education of new firemen before they are placed in regular service.

In connection with the latter item it is suggested that a school for new firemen be established at some central point

on each system, where applicants can be instructed concerning the principles underlying practical locomotive firing.

There are two fundamental principles in connection with the present method of fuel handling that I desire to call particular attention to today. The first is the necessity for a more complete and thorough understanding of the importance of fuel matters by operating officials. The responsibility for fuel economy has too long been considered purely a mechanical department matter. Operating officers, in many cases, have not been willing to assume their share of the responsibility nor to cooperate to the proper extent with other departments in order to gain the full economies possible under existing conditions.

The second is the necessity for a more careful consideration being given to the dollar-and-cents value of things. It is my firm belief that railroad men must educate themselves as to the cost of material, supplies and operation more fully than in the past in order that they may more properly analyze conditions and thus be better fitted to apply their best efforts to those matters wherein the largest and most practical savings can be effected.

POWDERED FUEL

Since the last meeting of this association the Chicago & North Western has equipped an Atlantic type locomotive for burning powdered fuel which is now operating in regular passenger train service between Chicago and Milwaukee and the Delaware & Hudson has just put into freight service a new powdered fuel burning Consolidation locomotive, probably the largest of this type in the world. The Delaware & Hudson is also installing a complete fuel drying, pulverizing, storage and disbursing plant, and is equipping the stationary boilers at Olyphant, Pa., for burning the waste tailings from anthracite culm banks. The Missouri, Kansas & Texas is installing a complete pulverized fuel preparing plant at Parsons, Kas., and applying equipment for burning pulverized coal and lignite in its stationary boilers and locomotives.

Various other steam railways, among which may be mentioned the Atchison, Topeka & Santa Fe, Grand Trunk,

Southern Pacific, Kansas City Southern, Chicago Junction, and Central Railway of Brazil, are now considering the use of pulverized fuel for locomotive service, the last named road having already decided to adopt it after an exhaustive three months' investigation made in the United States.

During the past year various fuels have been successfully burned in pulverized form in railway locomotive and stationary boilers performing regular service, and a list of some of these follows. The analyses are of the fuels when in pulverized form, ready for use.

Contents	Illinois Bituminous Unwashed	Kentucky Bituminous Screenings	North Dakota Lignite	Pennsylvania Run of Mine	Brazil, South America, Bituminous Run of Mine	Pennsylvania Anthracite Waste Tailings from Culm Banks	Pennsylvania Bituminous Run of Mine
Moisture (%)	From 3.18 to 15.36	1.9 to 2.8	1.8	0.72 0.95 0.51 0.88 0.67	7.90 9.15 1.73	Average 0.50	Average 0.50
Volatile (%)	Average 34.0	36.0	47.25	28.75 30.85 31.25 25.67 21.63	28.04 29.42 9.50	Average 8.30	Average 33.0
Fixed carbon (%)	Average 47.0	54.0	40.91	62.51 59.80 59.17 63.05 65.16	34.73 38.29 60.50	Average 72.09	Average 57.50
Ash (%)	Average 10.0	8.0	9.32	8.94 9.35 9.59 10.40 13.21	29.33 23.14 28.27	Average (12 to 22), 16.50	Average 9.0
Sulphur (%)	Average 1.70	0.79	0.72	2.49 2.30 2.21 1.64 1.51	3.16 2.61 9.1	Average (0.66 to 1.97), 1.00	Average 2.00
B. T. U.	From 10,720 to 12,400	13,964	10,960	14,096 13,773 13,804 13,912 13,671	8,820 10,080 10,177	Average 12,000	Average 13,750
Fineness:							
Through 100 mesh (%)	From 90.7 to 99.69	93.0	98.0	From 88.0 to 96.5	99.8 99.8 99.8	98.7 100.0 99.68	98.1 100.00 98.46
Through 200 mesh (%)	From 71.45 to 97.06	83.0	95.9	From 66.5 to 96.0	96.6 96.6 96.6	75.3 85.6 92.41	77.0 86.5 89.37

The usual methods for burning pulverized fuel necessitate the use of steam, air or mechanical contrivances for projecting the fuel, or a mixture of fuel and air, into the furnace. When applied to steam generators this process has resulted in failure due to the severe effect of concentrated heat on the firebrick and firebox. The more recent process, as applied to the Chicago & North Western and other steam locomotives, provides for a combustible mixture of fuel and air being automatically induced or drawn into the firebox by means of the front and draft, and its perfect combustion in suspension without any concentration of heat, due to the fact that the combustion flue way and the products of combustion are at all times being drawn toward an opening and thereby avoid any impinging action. Furthermore, this process is divided into three stages, *i. e.*, conveying and commingling of fuel and air, gasifying of combustible mixture, and perfecting of the combustion in the final high temperature heat zone, all of which insures completion of the combustion process.

From observations taken with fuels of different kinds and degrees of moisture and fineness, in every case the smokebox gas analyses will average between 13 and 14 per cent of CO₂ when coal is fired at the relatively low rate of about 3,000 lbs. per hour, and is increased to 15 and 16 per cent of CO₂ as the rate of combustion increases, so that there is no falling off in the efficiency, as obtains when coarse coal is fired on grates. At the same time the smoke box temperatures are maintained between 425 deg. and 500 deg. F. Summing up the results that are being obtained from the use of powdered coal in locomotive service, they may be stated as:

First—Smokeless, sparkless and cinderless operation.

Second—Maintenance of maximum boiler pressure within a uniform average variation of three pounds without popping.

Third—An increase of from 7½ to 15 per cent in boiler efficiency as compared with burning lump coal on grates.

Fourth—Saving of from 15 to 30 per cent in fuel of equivalent heat value fired.

Fifth—Enlarged exhaust nozzle area, resulting in greater drawbar pull and smoother working of locomotive.

Sixth—Elimination of ashpit delays, facilities and expense and reduction in time required for, and ease in firing up.

Seventh—Maintenance of a relatively high degree of superheated steam.

Eighth—No accumulation of cinders, soot or ashes in superheater or boiler flues, smokebox, or on superheater elements.

Ninth—No punishment or overheating of firebox, new or old sheets, seams, rivets, patch bolts, stay or flue beads.

Tenth—Elimination of arduous manual labor for building, cleaning and dumping fires.

Eleventh—Avoids expense and annoyance of providing various sizes and kinds of fuels.

Twelfth—Eliminates the necessity of front end and ash pan inspection and for special fuels, firing tools and appliances for building fires and for stoking and cleaning fires.

Thirteenth—Equal provision with engineer for fireman to observe signals and track, thus reducing liability of accident.

The committee is of the opinion that the effectiveness and utility of the use of fuel in pulverized form has been demonstrated from the past year's development, and that the prog-

ress in the use of this method of stoking and burning bituminous and anthracite coals and lignites for generating power, heat and light on railways will be quite marked from now on. The constantly increasing cost of railway fuel at the mine; the scarcity of fuel oil; the domestic and export demand for the larger sizes of coal; the prohibitive cost of briquetting the smaller sizes of coal and of lignite for railway use; the payment of labor on the run-of-mine basis for mining bituminous coals; and the necessity of eliminating smoke, sparks and cinders, will all tend toward the inauguration of this practical means and method for increasing the efficiency of steam boiler operation which today affords the greatest opportunity for improving locomotive and power plant costs and performance, and for changing public sentiment by smoke abatement.

The report was signed by: W. L. ROBINSON, chairman, (B. & O.); H. T. BENTLEY, (C. & N. W.); W. J. BOHAN, (N. P.); M. C. M. HATCH, (D. L. & W.); H. B. BROWN, (I. C.); D. R. MCBAIN, (N. Y. C.); A. G. KINYON, (Pow. Coal Eng. & Equip. Co.); H. C. OVIATT, (N. Y., N. H. & H.), and L. R. PYLE.

Discussion.—It was clearly shown that if powdered coal is to be used economically it is necessary to have thoroughly adequate machinery for drying and pulverizing it to the proper degree of fineness. The coal should not contain more than one per cent moisture and should be of such fineness that 95 per cent will pass through a 100 mesh screen and 85 per cent will pass through a 200 mesh screen. While this deg. of perfection was not obtained with the coal used on the Chicago & North Western locomotive there was a marked decrease in coal consumption shown in comparative tests. More than 30 per cent saving in the weight of coal consumed was obtained in the powdered coal superheater Atlantic type locomotive over a similar saturated steam locomotive hand fired and a saving of 15.92 per cent was shown over a similar superheated steam locomotive hand fired. The steaming capacity of the powdered coal locomotive was far greater, it being found necessary to replace the 3-in. safety valves with 4-in. safety valves to properly relieve the boiler. Tests made with powdered lignite on this locomotive showed that this grade of fuel could be utilized in this way to very great advantage to the roads in the Northwest where the cost of bituminous coal is high.

It was found that the fire brick used in connection with the powdered coal equipment does not burn out nearly as rapidly as was first expected, due to the fact that there was no pronounced impinging action of the flame on the brick work. It was found possible to increase the size of the nozzle on the North-Western locomotive which, of course, reduced the back pressure in the cylinders. Although some difficul-

ties were experienced with the formation of slag it was believed that if the coal was dried to one per cent moisture or less and with a proper air mixture, this difficulty would be obviated.

A mixture of anthracite and bituminous coal is being experimented with on the Delaware & Hudson powdered coal locomotive. At the present time a mixture of 40 per cent anthracite and 60 per cent bituminous coal is being used successfully and it is believed possible by further experimentation to bring this to 80 per cent anthracite and 20 per cent bituminous. In stationary plants 100 per cent anthracite powdered coal can be used.

It was pointed out that the cost of drying and pulverizing the coal would vary according to location and the amount of coal pulverized. One set of figures, given by H. G. Barnhurst of the Fuller Engineering Company, for the Lehigh Valley district showed a variation of \$1.00 per ton for a mill of 10-ton capacity to 29 cents for a mill of 250-ton capacity, these costs including the interest and depreciation of the entire plant.

The advantages mentioned for the use of the powdered fuel were the utilization of the cheaper grades of fuel, especially that now being absolutely wasted, a larger field for the use of lignite, less absolute fuel consumption, better utilization of the fuel, elimination of smoke, cinders and sparks, greater boiler capacity and greater safety in train operation due to the fireman being free to give closer observance to signals. It was also mentioned that due to the methods of mine operation at the present time the slack is obtained in larger quantities than ever before; this can be very advantageously used on powdered fuel installations.

EFFICIENCY OF RAILROAD OPERATION

By Samuel O. Dunn
Editor of the *Railway Age Gazette*.

It is the irony of fate that the managements of the railways of the United States should have been subjected to criticism for alleged inefficiency at the very time when they have been giving the most splendid demonstration of efficiency in the history of transportation. It is not exaggerating, but speaking the words of truth and soberness, to say that the courage and efficiency displayed by their managements, in meeting and triumphing over the unfavorable conditions with which they have had to deal during the last ten years, have never been exceeded in industrial history.

Many abuses have existed and many offenses have been committed on our railways; but we should begin to recognize and emphasize the fact that the shortcomings of their managements have been far more than compensated for by their constructive achievements. Consider briefly the circumstances in which their officers have had to do their work during the last ten years. In August, 1906, the Hepburn act went into effect, giving the Interstate Commerce Commission increased authority over rate-making and accounting and over some features of operation. Maximum freight rate laws, 2-cent fare laws, acts prescribing the number of hours that employees might be kept at work, the number of them there should be in train crews, etc., were poured forth in all parts of the country. There was a perfect cloudburst of regulatory laws and orders. There was one great and successful movement after another by railway employees for increases in their wages. There were demands for new and improved facilities—for steel cars, the elimination of grade crossings, the installation of block signals, and so on—which caused heavy additions to the investment demanding that a return be paid on it.

Let us see what was the effect of certain of the more important changes which occurred during this period on earnings and expenses. The average freight rate per ton per mile was reduced from 7.48 mills in 1906 to 7.33 mills in 1914, and the average passenger rate from 2.003 cents to

1.982. That cost the railways \$50,800,000 a year; and it includes nothing for the reduction of express and mail rates.

The taxes the roads had to pay were increased from 3.2 per cent to 4.6 per cent of their total earnings. This increase in the rate of taxation made the total taxes paid in the year 1914, \$42,650,000 greater than they would have been if this increase in the rate of taxation had not occurred. The average compensation of a railway employee in 1914 was \$218 greater than in 1906, which makes a total of \$369,600,000 more than it would have been on the basis of the average wages paid in 1906. These reductions in rates and increases in taxes and wages between 1906 and 1914 made a total increase in the annual burden, direct and indirect, that the managements had to carry of \$462,902,000. In 1906 it took 69 cents out of every dollar earned to pay operating expenses and taxes. In 1914 it took 77 cents out of every dollar earned to pay operating expenses and taxes. If none of these changes in rates, taxes and wages had occurred, and the roads had been managed and operated otherwise just as they were, their net operating income in 1914 would have been \$1,168,900,000 instead of only \$706,000,000, and it would have required only 61 cents out of each dollar earned to pay expenses and taxes, as compared with 69 cents, the outlay per dollar of earnings for operating expenses and taxes in 1906, and 77 cents, the actual outlay for these purposes in 1914.

These data are a striking vindication of the efficiency of the management of our railways. They show clearly that the roads were constantly being operated more and more economically, but that much faster than they could save money it was being taken from them. They also show that it was the rate-regulating authorities, the tax gatherers and the employees who were taking it. Let us hope that the time will come when those who serve the railways, and through them the public, so well as do the International Railway Fuel Association and its members, will have their work better appreciated by the public, and will not see the results of it constantly swept away chiefly to benefit classes of persons connected with the railways who constantly strive to prevent increases in the efficiency of operation or other classes of persons who are not connected with the roads at all.

INTERPRETATION OF COAL ANALYSIS

By E. G. Bailey.

The purpose and value of coal analysis should be better understood. The chemist, as a rule, passes his figures on to the purchasing agent or superintendent of motive power with little or no comment or interpretation. The man who is responsible for the buying or burning of the coal accepts the figures from the chemist for the purpose of comparison, and proceeds to draw certain conclusions as to the relative value of the coals under consideration, based upon one or two constituents, such as the percentage of ash, sulphur or B. t. u., according to his own ideas of what the chemist's figures really mean. Very often these conclusions are not borne out by the practical road tests or the actual use of the coal in regular service.

It is regretted that too often the results of the chemical analysis are wrong, not by insignificant fractions of one per cent, but by several per cent or several hundred B. t. u. Very frequently the trouble is in the sampling, the original sample not being large enough to be truly representative, or else not having been properly reduced and pulverized. The sampling question is of much greater importance than it has usually been considered. The methods of sampling and analysis recently proposed by committees of the American Society for Testing Materials* and the American Chemical Society, should be carefully considered.

In the case of coal used for the generation of steam, whether in stationary, locomotive or marine practice, the

*Proceedings American Society for Testing Materials. Volume XV Part 1. Also Year Book 1915.

primary factor is the heating value of the coal. The cost of fuel alone is not the sole criterion on which to judge the value of the fuel, for the character of the fuel has a great deal to do with the cost of repairs to grate bars, furnace linings and arches, and is of very great importance in the case of locomotive practice.

While the heating value of a fuel may be the item of primary importance, yet the effect of the non-combustibles upon the action of the coal in the firebox has such a modifying influence that very frequently the coal with the higher heating value gives the poorer results. Anyone who has depended upon coal analyses without the proper interpretation, and has not given full weight to the effect of the impurities which accompany the heat producing elements, has not been able to secure very much benefit from coal analysis.

The usual analysis of coal gives the percentage of moisture, volatile, fixed carbon, ash and sulphur, in addition to the heating value. The moisture is of course a non-combustible. It produces no heat, but is on the other hand an absorber of heat, as it must be vaporized and sent from the boiler as superheated steam at the stack temperature. Assuming a stack temperature of 700 deg., the total heat required to vaporize and superheat one per cent of moisture amounts to only 1/10 per cent of a 13,000 B. t. u. coal. This of itself is not a serious matter, so that the principal importance of moisture is that it acts as so much inert matter, which is paid for at the same price as coal. This applies only to the moisture which is in the coal at the time of its being weighed. It must be remembered that the percentage of moisture as shown by the usual analysis does not include all of the water or H₂O compound present in the fuel, for there is a considerable amount of water that cannot be dried from the coal even at 220 deg. F., but remains in chemical combination probably as a carbo-hydrate, and can only be driven off with the volatile constituents.

According to the best authorities all of the oxygen which occurs in coal is combined with hydrogen, either as moisture, combined water or in the form of a carbo-hydrate, and that which is not shown in the analysis as moisture is included in the volatile.

By dividing the volatile matter of a typical West Virginia gas coal into its different elements, hydrogen, oxygen, carbon, nitrogen and sulphur, it is found that in the volatile there is a total of 5.38 per cent of the total coal, or about 13 per cent of the volatile, that is water, besides some nitrogen and sulphur as non-combustibles. Making a similar division of the proximate analysis of a typical Illinois coal, we find that 9 per cent of the total coal occurs in the volatile in the form of water, or 25 per cent of the volatile itself is non-combustible. In the case of lignite and peat, the percentage of volatile which is non-combustible proportionately increases. So that in this we see that volatile itself is not an indication of rich locomotive fuel, for much depends upon the nature of the volatile, and how much of it is impurities and how much combustible. Then in the combustible itself there is considerable variation, depending upon the relative percentages of available hydrogen and carbon.

The percentage of moisture retained in coals varies widely with the characteristics of the coal, and this point should be taken into consideration in comparing coals from different fields. In order to get a more uniform basis of comparison it is all right to compare different shipments of coal from the same region on a dry basis, but it is not right to compare coal of one character with coal from another region of different character on any other basis except with their normal moisture content that is fairly representative of the different districts. A coal which normally has a high moisture content usually has a relatively large percentage of its volatile matter in the form of combined water.

The impurity which is always present in coal, and the one

which is of the greatest importance, is the ash. The ash is a very different proposition from the moisture, for it is not only inert and non-productive of heat, but it may have very marked effect upon both the rate and efficiency of combustion. The composition of ash varies widely. An ash which does not clinker gives very little trouble, and is not much if any more detrimental than so much moisture. But an ash which melts into a clinker is more difficult to get rid of. It obstructs the flow of air to a serious extent, and many times it adheres tightly to the grates and obstructs the air so completely that the heat of the fuel bed is conducted to the grate bars and causes them to burn.

The question of clinkers is one of the very vital problems in locomotive practice, and heretofore practically the only means of getting any information upon this important characteristic of fuel was the actual trial. A very thorough study into this phase of the fuel problem some years ago led the writer to conclude that the whole question of clinkers could be summed up in the fusing temperature of the ash and the temperature to which this ash is subjected. Some ash has such a high fusing temperature that there are practically no fuel bed conditions that will produce troublesome clinker from it. Another ash with a little lower fusing temperature will clinker together and form a porous, spongy clinker which does not form a serious obstruction to the flow of air, nor is it difficult to remove. The ash with a still lower fusing temperature, say 2,100 deg., will not only become melted in the average firebox, but it will be heated several hundred degrees above its melting temperature, in which case it runs down like overheated iron until it spreads out in a thin sheet over the grate bars. Clinker accumulates gradually, and is more or less open and does not obstruct the air beyond the critical limit. But slicing or working the fire, causing the ash, which has already been liberated from the coal in the lower and cooler part of the fuel bed, to be again thrown up into the hotter zone, will melt it into a very fluid mass and obstruct the air flow to a serious extent.

Many people have considered that the percentage of sulphur was a true indication of the clinkering property of a coal, but in steam coal it is of minor importance. It is true that in some coal fields the variation in the clinkering property of coal received from different mines does follow the percentage of sulphur to a certain extent. Sulphur is an indirect cause, however, for it is really the iron which has the effect upon the fusing temperature, and the percentage of iron usually increases or decreases with the sulphur. There are so many exceptions to the relation between sulphur, or even iron, and the clinkering property of coal, however, that a dependence upon either is apt to lead to erroneous conclusions.

While the heating value of coal may be considered the essential element, yet it means very little unless the percentage and character of the impurities existing in the coal are fully considered. It is found that the heating value per pound of combustible is practically uniform for all coals from any one district, practically the only exception being in the case of crop coal. So the question resolves itself largely into the percentage of ash, and its clinkering property, as being the critical factor to be considered in comparing the commercial value of different fuels of the same character. When it comes to comparing coals of different character practical tests are the only reliable means of arriving at comparative results.

Discussion.—It was generally agreed that ordinarily the sampling of coal was very poorly done which gave erroneous results. A mechanical sampling device being tested at the University of Illinois was believed to satisfactorily solve this difficulty. The moisture content of the coal was believed to be objectionable only to the extent that it is being paid for as real coal. Some advanced the idea that the oxy-

gen compounds were of advantage in that they assisted in the combustion of the coal. The trouble from clinkering will be materially reduced if sufficient air is allowed to pass through the grates and thoroughly oxidize the iron content in the coal. Exception was taken to the statement regarding the uniformity of the coal in the same districts. Examples were mentioned of varying grades of coal even in the same vein. One coal operator believed that the best results would be obtained from analyzing the coal at the face of the mine, determining the percentage of foreign matter in the vein and using this as a check on the fuel delivered, inspections being made occasionally of car loads of coal to determine the percentage of foreign matter.

FUNCTIONS OF A RAILROAD FUEL INSPECTOR

By Eugene McAuliffe

If the position of fuel inspector is to be developed to the point where the greatest return will be secured, the man filling that position should have capacity for analysis, and should further be capable of putting his deductions into tangible shape, conveying to others in a convincing manner the results he has worked out. The function of the fuel inspector will vary with the conditions surrounding the source of the railroads' fuel supply, which might be primarily divided into the following classes:

First: The road which produces its own coal from mines located on its own rails, wholly controlled by the railroad corporation, and which produces no commercial coal.

Second: The road which buys from mines located on its own rails, which are controlled through subsidiary corporations, and which engage also in commercial trade.

Third: The road which buys wholly or in part from independent producers located on its own rails.

Fourth: The road which, not traversing a coal producing territory, buys its fuel supply from mines located on the rails of other carriers or f. o. b. the docks of waterway carriers.

I see little necessity for distinction as between Classes 1, 2 and 3, and even though a railroad absorbs the entire output of a mine it owns and supposedly controls, there is quite as much room for endeavor there as there is at mines which bear no closer relation than that of the contractual one. It is in the case of Class 3 that the inspector can perhaps find the broadest field of endeavor, and on the other hand, relieved of all consideration of traffic, as is frequently the case, the inspector who has to do with a fuel supply from sources covered by Class 4 can concentrate on the item of quality more fully than can the inspector who is dealing with the sources of supply shown in Classes 1, 2 and 3.

For convenience I will attempt to divide the more important duties of the inspector under certain subheadings:

What Does the Contract Call For?—Every inspector should be furnished skeleton copies of all contracts containing every feature with the price per ton left blank in order that competitive prices may not by accident fall into the wrong hands, thus admitting of the inspector reading any portion of the specifications to mine foremen when dispute arises. Too many inspectors are merely told that a certain tonnage is due daily, with the result that tonnage is the only certain quantity they do get.

Knowledge of Mines and District.—The inspector should have a full knowledge of the mines in each district he serves, as well as the district itself. When it is considered that mine districts producing a common grade of coal and moving under a uniform freight rate sometimes extend over a zone 80 miles long, the possibilities of reducing empty and loaded car haul will be apparent. A knowledge of the mine, the field, and the train service which will best serve it, can be used to marked advantage;

(a) In assigning tonnage from certain mines to stations located in the direction of shortest haul for loads and empties,

making it possible also to put the preferential grades of coal where the power and service conditions make such most valuable.

(b) A study of the methods employed at all mines will admit of suggesting to certain operations the application of practices and appliances successfully used in other mines.

To get over a field successfully the inspector should be equipped with a portable gasoline propelled car.

What Constitutes Inspection.—Assuming that the inspector has been provided with copies of contracts, the enforcement of grade specification still remains in so far as results are concerned, a relative matter; in other words, the ideal can only be attempted, and the degree of success attained is best determined by comparison. The greatest controllable losses in quality of fuel lie in the direction of excess moisture and ash content, and where sulphur and its concomitant refractory ash making constituents occur in large quantities, a general attempt at excess ash control will usually in turn keep all such down.

It is entirely possible to equip every fuel inspector with simple apparatus and a formula easily understood, which will make the determination of ash and moisture content within reasonable limitations easily obtainable. United States Geological Survey Bulletin No. 621-A, "Field Apparatus for Determining Ash in Coal," by C. E. Lesher, Department of the Interior, U. S. Geological Survey, describes in simple language the apparatus and practice necessary to conduct this test.

Car Supply.—When cars are placed and the men are in the pit and on the tipple the production of a coal mine may commence; at the moment the car supply is exhausted the mine stops producing. The coal mine is dependent for operation on: Sales orders; car supply; labor, and unforeseen contingencies, including gas conditions, ventilation, water, falls of material overburdening the coal, etc., many of which cannot be foreseen.

Mine switch service is for this reason exacting in its nature; time is the essence of delivery; no inbound movement furnishes even a partial car supply for outbound loading. No man can do more to raise the standard of this branch of mine service than can the competent fuel inspector, who works closely with the yardmaster, despatcher or superintendent who handles this work. The proper placement of foreign line cars, so that they may be quickly loaded and moved in the direction of home is important. The time lost by holding cars at mines, including delays incident to cars left over, empty or partially unloaded, unbilled loads, etc., is astonishingly large; an average delay of five or six days in moving all cars in and out of many mining districts is not uncommon. No railroad can own an average capacity coal car at an expense of less than 60 cents per day, counting interest, depreciation, taxes and repairs; too many men confound the agreed per diem rental with the cost of owning a coal car; they are dissimilar quantities, and when cars are in sharp demand \$2 to \$3 per day is not an excessive value to put on one. Bear in mind also that coal and coke cars at mines and ovens, unlike cars loaded or awaiting loading with other commodities, earn no demurrage when empty or loaded; all of these matters come under the review of a fuel inspector who is in the field and on the firing line.

Proper Carload Weighing.—The fuel inspector can assist materially in improving the standard of track scale weights, particularly when weights are made on scales located near the tipple. The use of actual or stenciled tare weights, the movement of cars over scales, cleanliness of scale under tipplers, frequency with which scales are balanced, and the effect of waste coal resting on scale platform are deserving of attention. The inspector can profitably acquaint himself with proper scale methods, and a half hour spent in the observation of scaling practice employed at each mine at occasional intervals is productive of results.

Inbound and Inter-field Revenue.—There is a certain amount of inbound traffic in all coal fields which it is frequently taken for granted will route to the best advantage of the carrier serving the field. Such is not always the case, and if due notice is given the proper department of anticipated shipments, frequently such change in junction point routing can be made as will secure a reciprocal tonnage without prejudice to the shipper. There is also a certain amount of inter-field switching, and it is not uncommon to find coal cars assigned to certain free service without the knowledge of the station agent or superintendent. Supervision over this can be always improved by the observation and help of the fuel inspector, who is constantly in the field. Perhaps the greatest service that he can confer on the traffic and operating department is that of assisting in the enforcement of the work of loading coal and coke cars to their full carrying capacity.

Inspection of Anthracite Coal.—On the average railroad anthracite coal is used only for coach and depot furnace use, and the consumption is limited. A sufficiently competent inspection of a limited tonnage of anthracite can be made by:

(a) Observing the per cent of coal under size, including pea and buckwheat sizes.

(b) Note the percentage of rock or slate, readily removable, that is mixed with the coal. By taking a few scoopfuls of the material as furnished, and by hand-picking the rock and slate, the relative percentage of each can be quickly determined by weight, and even approximated by observation. It is not uncommon to receive eastern anthracite with 10 per cent of rock and slate which should have been removed in the breaker; and when coal costs, delivered, from \$6 to \$10 per ton, the loss per 1,000 tons is very material, even though we disregard the excess trouble incurred in using the coal.

Inspection of Fuel Oil.—Fuel oil should be purchased under specifications, and the inspector should be provided with a standard Fahrenheit thermometer, a Baumé or specific gravity gage and a standard centrifuge testing machine. The thermometer is used to determine the temperature of the oil in storage tank or tank car, and when it varies from 60 deg. F. due allowance in gallonage should be made from a basis of 60 deg. F., ordinary fuel oil contracting when the temperature is below 60 deg. F. and expanding when above 60 deg. F. .05 of 1 per cent for each degree, a variation of 20 deg. F. equal to 1 per cent in volume, or about 2.4 barrels of 42 gallons each in a 10,000-gallon carload. When a cold test is provided for in a contract such can be best made in the laboratory. The centrifuge testing machine, easily managed, is used to determine the percentage of water and sediment contained in the oil, and where crude oil is purchased this test is necessary in order that the proper deduction in volume be made for a non-combustible content in excess of the agreed maximum. Unless care in unloading is exercised many cars will go back to the loading rack with a material amount of oil left in them; this due to unloading cars standing on grades, carelessness of employees in cold weather, etc.

General.—In closing, it can be said that while the above schedule of duties may seem extensive to the man just entering the field as a fuel inspector, they do not represent 75 per cent of the items that will appear to the competent observing man as deserving of care and supervision. A fuel inspector who is competent will organize his work and indirectly create a staff of helpers at each mine or storage pile he reaches. The fuel inspector should be able:

- (a) To establish a proper standard of quality.
- (b) To measure results quickly and accurately.
- (c) To make the mine employees his willing helpers.

(d) To impress all with the fact that it is not his desire or intention to spend one day on one certain coal tipple, the next on another, and so on to the end of the month, getting a 10 per cent result, but on the other hand, to establish and secure automatically a standard of efficiency instead.

Discussion—The coal operators seem to feel that the fuel

inspector is of advantage to them in that he serves to keep the organization at the mines up to standard. The mine operators can be greatly assisted by having ample car supply. A shortage of cars materially increases the cost of production due to the overhead charges. The inspectors should see that the cars are loaded to capacity; this will reduce the number of cars required, decrease the empty coal car mileage, per diem charges and, in many cases, switching charges at terminals. The cars, however, should be so loaded that there will be no danger from coal falling from the cars during transit which sometimes causes accidents. It was stated that the cost of owning a coal car is at least sixty cents per day.

EXHIBITS

There were 28 exhibits in connection with the convention at the annual meeting of the International Railway Supplymen's Association, held Monday afternoon, president F. N. Bard presiding. A constitution and by-laws were adopted and the following officers elected for the coming year:

President, C. W. Floyd Coffin, Franklin Railway Supply Company, Chicago; vice-president, W. G. Clark, Locomotive Stoker Company, Chicago; treasurer, G. S. Turner, Harry Vissering Company, Chicago; secretary, F. S. Wilcoxen, The Pilliod Company, Chicago; executive committee, for one year—C. W. Floyd Coffin, Franklin Railway Supply Company; W. G. Clark, Locomotive Stoker Company; H. D. Savage, American Arch Company; for two years—F. S. Wilcoxen, The Pilliod Company; A. A. Taylor, Fairbanks, Morse & Co.; G. S. Turner, Harry Vissering Company; for three years—E. E. Barrett, Roberts & Schaefer; G. E. Ryder, Locomotive Superheater Company, and Clarence Mellor, Barco Brass & Joint Company.

The following is a list of exhibitors:

- American Arch Company, New York—Security arch. Represented by W. L. Allison, F. G. Boomer, G. C. Denney, J. T. Anthony, J. P. Neff, H. D. Savage, Le Grand Parish, John L. Nicholson, R. J. Himmebright, A. W. Closkey and George E. Crisp.
- Barco Brass & Joint Company, Chicago—Barco metallic engine and tender air and steam heat connections, Barco joints, Barco air reservoir connections and Barco smoke box blower fitting. Represented by F. N. Bard and C. L. Mellor.
- Dearborn Chemical Company, Chicago—Feed water treatment for locomotive use. Represented by J. D. Purcell, J. H. Cooper, F. C. Fosdick and O. H. Rehmeyer.
- Detroit Lubricator Company, Detroit, Mich.—Flange and cylinder lubricators. Represented by R. H. Lindman and A. D. Howard.
- Economy Devices Company, New York—Woodward truck, radial buffer and Economy exhaust nozzle. Represented by J. L. Randolph and J. Sinkler.
- Fairbanks, Morse & Company, Chicago—Photographs of coaling stations, mine tipples and ground storage. Represented by J. C. Flannigan and A. A. Taylor.
- Foxboro Company, The, Foxboro, Mass.—Pyrometers, gages, thermometers, tachometers, temperature controllers and steam flow meters. Represented by F. W. Carret.
- Franklin Railway Supply Company, New York—Franklin fire door. Represented by C. W. F. Coffin, Ralph Coburn, Sam Rosenfelt and H. H. Evans.
- Garlock Packing Company, The, Palmyra, N. Y.—Fibrous and metallic packings. Represented by C. W. Sullivan.
- Hunt-Spiller Manufacturing Corporation, Boston, Mass.—Exhaust nozzle, air furnace gun iron castings. Represented by V. W. Ellet, E. J. Fuller and W. B. Leach.
- Jeffery Manufacturing Company, Columbus, Ohio—Photographs of single roll coal pressure, Arcwall mining machine and electric mine locomotives. Represented by P. C. Dierdorf, S. S. Shive and C. C. Ford.
- Lehigh Car Wheel & Axle Works and Fuller Engineering Company, Catawissa, Pa.—Lehigh stoker and Fuller-Lehigh pulverizer. Represented by J. W. Fuller, H. C. Shields, H. G. Barnhurst, L. A. Salade, W. B. Neide and W. D. Wood.
- Leslie Company, The, Lyndhurst, N. J.—Steam heat regulators and Presto coupling nuts. Represented by J. J. Cozek.
- Locomotive Stoker Company, New York—Locomotive stoker. Represented by E. F. Millbank, W. G. Clark, C. F. Street, E. Prouty, J. J. Hanaha and O. B. Clapps.
- Locomotive Superheater Company, New York—Photographs of superheater and pyrometer. Represented by George Fogg, William Boughton, J. Mourne, R. R. Porterfield, Gilbert Ryder, G. Spangler and H. T. Spicer.
- Manning, Maxwell & Moore, Inc., New York—Hancock inspirators, Ashcroft gages and boiler fittings. Represented by C. L. Brown, F. J. Wilson and C. J. Bryan.
- Mudge & Company, Chicago—Mudge-Slater spark arrester. Represented by G. W. Bender and W. W. H. Bentley.
- National Railway Devices Company, Chicago—Shoemaker fire door. Represented by Jay G. Robinson, E. J. Gunnison and M. M. Auerbach.

Ogle Construction Company, Chicago.—Working model of coal handling plant. Represented by C. F. Bledsoe, M. W. Powell and R. A. Ogle.

Ohio Injector Company, Chicago—Automatic drifting valve and Chicago water glass protector. Represented by W. S. Furry and A. C. Beckwith.

Old Ben Coal Corporation, West Frankfort, Ill.—Coal. Represented by Dr. J. E. Beebe.

Pyle-National Electric Headlight Company, Chicago—Type K Pyle-National headlights and reflectors. Represented by J. Will Johnson, Wm. Miller and L. H. Steger.

Roberts & Schaefer Company, Chicago—Photographs of coal and sand handling devices. Represented by C. P. Ross.

Simonds, G. L., & Company, Chicago—Dean arch tube cleaner, Vulcan soot cleaner, Hayes gas analyzers and draft gages. Represented by F. A. Moreland and G. L. Simonds.

Stroud, E. H., & Company, Chicago—Stroud powdered coal stoker and Stroud air separation coal pulverizer. Represented by E. H. Stroud.

Tyler Company, The W. S., Cleveland, Ohio—Draftac spark arrester and front end netting. Represented by J. H. Jackson and A. D. Busch.

U. S. Metallic Packing Company, The, Philadelphia, Pa.—King metallic piston rod and valve stem packing. Represented by Morris B. Brewster, R. R. Wells and E. Curtiss.

Vissering, Harry, & Company, Chicago—Locomotive specialties. Represented by G. S. Turner and A. G. Hollingshead.

The report of Wednesday's and Thursday's sessions of the convention will be published in next week's issue.

SHORT LINE RAILROAD ASSOCIATION OF THE SOUTHEAST

About 50 presidents and general managers of short line railroads in the southeast and southwest attended the convention of the Short Line Railroad Association of the Southeast, held at the Grunewald hotel, New Orleans, La., on May 10 and 11. Martin Behrman, mayor of New Orleans and president of the Public Belt Railroad of that city, delivered an address of welcome which was responded to by B. S. Barker, vice-president of the association, and vice-president and general manager of the Gainesville & Northwestern Railroad. Bird M. Robinson, president of the association, and receiver of the Tennessee Railway, made an opening statement regarding the work of the association of which the following is an abstract:

PRESIDENT'S ADDRESS

Generally speaking, there are two classes of railroads: trunk lines and non-trunk or short lines. There is no well-defined line of demarcation between these two general classes. There is, however, a substantial difference. The non-trunk lines consist largely of the short or small roads. It is true that there are a few short roads that, owing to their location and connections, are trunk lines, and it is equally true that there is a considerable number of roads from 300 to 500 miles in length, that are non-trunk lines. I include in such classification roads that originate the great majority of traffic that they handle.

The best information obtainable indicates that there are from 800 to 1000 non-trunk lines in the United States. Of that number probably 700 would be classed as short lines.

The fight made on the railroads has been directed almost exclusively against the trunk lines; the wrongs, or imaginary wrongs charged were done or alleged to have been done by the trunk lines. The defense made has been conducted almost, if not exclusively, by the trunk lines.

Little or no consideration seems to have been given the non-trunk or short lines by anyone. They were and are widely scattered. A majority of them were located in outlying districts, and they were wholly unorganized. Few of the officers or managers of such lines had any acquaintance with the officers of other like lines. The result was as disastrous as might have been expected. Many of them became bankrupt, and a great majority of the others were crippled financially, to an extent that it will require years to restore them to the condition which they justly deserve.

The old maxim, "What is everybody's business is nobody's business," was true so far as the non-trunk lines were concerned and seems to be true now so far as a large part of them are concerned.

In September, 1913, a few of the managers of short line railroads, largely in the state of Georgia, organized this association in Atlanta, with 22 railroads as members. We now have, at the end of two and one-half years 105 members.

The organizers realized that the association must be a co-operative body; that it could not succeed if there was any attempt at coercion, hence the articles of the association contain no power to legislate, or to force members to do anything.

The object was to have an organization that would look after the interest of its members in all matters that pertained to the common good. For example: to look after bills pending before Congress which might affect the interest of all the non-trunk lines, such as the mail pay question and the many questions of equal importance that are presented there each year.

A second object was to have an organization that could appear before the Interstate Commerce Commission in a representative or authoritative way and seek relief from any unfair or burdensome rules, regulations or orders such as the physical valuation of railroads.

A third object was to bring together the non-trunk lines in each state for the purpose of looking after matters affecting such lines in their respective states. A vice-president for each state was authorized. He is expected to keep in close touch with legislation pending in his state, as well as matters before the railroad commission and when necessary to invoke the assistance of members in such states.

Another object in view, and one that is now worthy of serious consideration, is the establishment of a business organization; one that will serve its members economically and efficiently in many ways. For example, the joint purchase of supplies of any or all kinds, making a joint contract for insurance of various kinds, and the appointment of a joint attorney before the Interstate Commerce Commission.

The foregoing is but a limited statement of the objects in view, but it will serve for the present.

The officers of the association have realized from the beginning that it was a labor of love, pure and simple; that there had been no co-operation between the various non-trunk lines; that the managers of such lines were not only thoroughly discouraged but that most of them would not believe that any real relief could be gained by an organized effort.

Nowithstanding the pessimistic or antagonistic view taken by many, in fact, most of the managers of non-trunk lines, the association was organized and proceeded with its work. The Interstate Commerce Commission, in putting into effect the law providing for the physical valuations of railroads, adopted rules and regulations, that this association deems unnecessarily burdensome and unfair to the non-trunk lines. The association sent its committee to Washington and presented its views and arguments to the commission, and asked for certain modifications of the regulations and requirements. The commission granted that request and made the necessary modifications. This one work resulted in a saving of from \$25 to \$75 per mile, not only for its members, but for all other railroads in the country. This saving for the members of the association is equal to or exceeds all of the dues and assessments that they will, at the present rate, pay in 50 years.

This association has demonstrated that an organization of the non-trunk or short lines can succeed and can accomplish more good for such lines, than can any other kind of an organization. It has on several occasions gained a friendly hearing from some of the most radical opponents of railroads, and has caused them to say publicly that such roads deserved special consideration.

In the discussion of the mail pay question, the members

of the Senate committee, and the members of the House, have stated publicly that the non-trunk or short lines were in a class by themselves and deserved special consideration. Many of the state railroad commissions have recently responded favorably to the efforts of the non-trunk lines. In fact many things indicate that the non-trunk lines can now get substantial relief from burdens if they will co-operate and work intelligently for what they need.

The question is, who will do the work, and what assistance will be rendered? The most important work to be done, is general, and not sectional in any sense of the word.

It is quite apparent that Congress is constantly increasing the number and extent of the federal laws governing railroads. It is equally apparent and certain that the federal courts are by interpretation and construction extending the laws passed by Congress, hence the federal laws and the Interstate Commerce Commission are becoming more and more the controlling powers. The rights of the states and their commissions are being limited and will be limited in every way possible.

Almost every congressional district has one or more non-trunk lines within its borders. Some districts have several. A great majority of these lines are owned or operated by local people. In most instances the officers and directors are the most influential business men of the community. These lines are so situated and so equipped with personal influence that they can, if they will, reach practically every Senator and every member of the House. They can obtain serious consideration of all facts and statements presented. I am convinced after extended personal contact, that the majority of Senators and members desire to give special consideration to the non-trunk lines, but that they discount facts and statements made by strangers, whereas they take real pleasure in considering information furnished by the non-trunk lines in their own states or districts, or by the organization representing such lines. Senators and members cannot keep posted on every bill presented. They cannot follow and know the effect of bills covering every conceivable subject, and it is suicidal for the non-trunk lines to remain idle, relying upon their respective Senator or member to keep them posted and to look out for their interest. The obligation is upon the manager of the railroad, not only to keep posted, but to see that the merits or demerits of all bills affecting railroads are understood. This has not been done for the reason that but few of the managers of the non-trunk lines had any knowledge of adverse or harmful legislation until after such measures had become the law. As I view it, that condition will continue until such time as the non-trunk lines proceed, not only to protect themselves, but to protect business as a whole so far as they can.

Do not fear to become active and work hard, and openly for protection and relief. The enemy or opposing selfish interests are working constantly and both openly and secretly.

This association asks the co-operation and assistance of all non-trunk lines within its territory, regardless of their length or ownership. The general principles for which we are working affect all alike. Experience has shown that the real short lines frequently have just the influence needed. The present members are not afraid that the little brother will capture the association and run away with it, nor are they afraid of being outvoted in arranging for the work to be done. We invite the longer non-trunk lines to join, believing that they can accomplish more and fare better by not pushing into the trunk line class, and thereby remove themselves from the benefits that can be and we believe will be gained for the non-trunk lines.

The Supreme Court has held that every branch of the railroad business should be self-supporting. That decision makes it quite clear that each railroad should be self-supporting regardless of the fact that some trunk lines may own its stock, or may operate it. The policy of this association

on that subject was settled at its last meeting by the adoption of the following resolutions:

"Resolved, That it is the sense of this meeting, that all short line railroads in the southern and southeastern states, regardless of the question of ownership and control, should become and be members of this association, and be it further

"Resolved, That we respectfully request and urge the main line companies, owning or controlling short railroad companies within our territory, to direct the officers of such short roads not only to join this association, but to aid in the work being done for the benefit of all such roads."

We cordially invite all non-trunk line roads to join us regardless of the ownership of their stock.

There are many kinds of organizations among railroads, and the most, if not all of them, fill a place all their own. The special work to be done by and for the non-trunk lines cannot be done successfully by any organization containing other elements, or organized for other purposes. In other words, the work is special and must be backed up exclusively by the strength of the non-trunk lines as such.

We realize that it is difficult to make and maintain an organization which is intended to devote its energies exclusively to the general good. We are now preparing to perfect the organization to such an extent that it can and will serve any and all members in the daily administration of their business. Many things can be done for individual members that will effect a saving greatly in excess of all costs involved.

This association has made a very successful beginning, but the workers are comparatively few. The work to be done is great, and it affects and interests all alike. We therefore call upon all non-trunk lines to join and do their share of all that should be done.

Commissioner Henry C. Hall, of the Interstate Commerce Commission, who had been expected to address the convention, was unable to attend, but sent a telegram saying that he appreciated the object and efforts of the association, and called the attention of the members to the fact that the commission's doors are open to them at all times for the consideration of any of their difficulties which may arise within the jurisdiction of the commission.

Following the report of the executive committee, reports were presented by the state vice-presidents, each of whom discussed conditions affecting short line railroads in his state with a general discussion of the plans for the work of the association. Various committee reports were then presented and discussed, the first subject being that of physical valuation of railroads. This was presented by H. H. Trabue, assistant chief engineer and real estate agent of the Nashville, Chattanooga & St. Louis, Nashville, Tenn., who was asked and answered numerous questions by members regarding details of the valuation work. The same subject was discussed by H. S. Jones, special engineer in charge of valuation of the Mobile & Ohio, Mobile, Ala. The subject of railway mail pay and four-year contracts for the carriage of the United States mail was discussed by S. S. Ashbaugh, counsel for the New York, New Haven & Hartford, and H. B. Helm, vice-president of the Louisiana Railway & Navigation Company, which company has been in controversy with the government on questions pertaining to mail pay for some time. There was also a brief discussion on the subject of an association pass, which it is proposed to have adopted by all members of the association, to avoid the expense of separately issuing transportation. Other subjects discussed were the following: "Classification of Railroads by the Interstate Commerce Commission," "Compulsory Representation in the Official Railway Equipment Register," and "Statements of Tonnage of Short Line Deliveries to Trunk Lines to Show Originating Strength of Short Lines."

The meeting was adjourned subject to the call of the president. It is expected that the annual meeting will be held in September at Atlanta, Ga.

The Railway Storekeepers' Association

Proceedings of 13th Annual Convention; Reports on
Scrap, Accounting, Reclamation and Track Materials



THE thirteenth annual convention of the Railway Storekeepers' Association was held at the Hotel Statler, Detroit, Mich., May 15, 16, 17, President J. G. Stuart, general storekeeper of the Burlington, presiding.

The invocation was offered by Rev. C. B. Emerson, after which the association was welcomed to the city by Hon. Oscar B. Marx, mayor of Detroit.

In his opening address President Stuart emphasized the continued need of economy. Material should be used to the very best advantage, as the railroads are now confronted with industrial conditions differing from any previously experienced. The manufacturers are doing their best to meet the demand for material, but the demand greatly exceeds the supply, so that special efforts must be made to obtain the best possible service from material now on hand.

The work of the storekeeper is continually broadening and in selecting a man for promotion he should not be chosen simply because he has filled a certain position, but because he has filled it in such a way as to impress his superiors with his ability to handle something larger. The storekeeper should get around and familiarize himself with conditions and needs in the various departments, and study the conditions under which the work is done, so that he will realize fully the need or the lack of need of material that is ordered. The conventions can aid greatly in helping the storekeeper to give what is demanded of him—service.

The secretary-treasurer reported a cash balance of \$171.80, and an active membership of 791.

PIECE WORK

There was no committee report on piece work, but several members gave the results of their experience. D. C. Curtis of the Burlington stated that care should be taken to get the prices right in starting. There should be no mystery made of it with the men; under these conditions a piece work system will hold laborers with less shifting than day work. Do not try to change prices unless conditions are changed. J. H. Waterman of the Burlington gave it as his opinion that prices should be made so carefully at starting that there will be no need to readjust downward, which frequently causes dissatisfaction among the men.

It has been found on the Rock Island that piece work laborers stay longer with the company than do men employed at a day rate. This road pays its foremen an hourly bonus

for work done during the time a gang is working on piece work.

ACCOUNTING

The accounting committee made the following recommendations:

That detail accounting be done by storekeepers at stores where the material is actually disbursed, and original requisitions be retained by them, except at outlying points under jurisdiction of employees of other departments, or where issues are so small that it is unquestionably desirable for accounting in connection therewith to be done at the division store controlling the territory, or at some other central store.

That storekeepers, where accounting is done, make distribution by values to primary operating accounts, operating divisions, main and branch lines, states, etc., and render necessary reports covering this and other accounting functions direct to auditing departments or thereto through higher store department consolidation offices, at the option of the carrier.

That as this association, in its convention at St. Louis in 1910, recommended basing the comparison of efficiency of operations on the unit of stock on hand and disbursements for actual use or other final disposition, reports of such operations shall be segregated according to the material classification adopted by this association, so that in such reports the materials or classes handled by the store department of each road will stand out clearly and can thus be compared intelligently with any other road in classified form. Thus any groups not handled by one road would be omitted and we would not endeavor to compare one property with another on materials handled by the one which are foreign to the store department jurisdiction of another.

That by reason of the present requirements of the Interstate Commerce Commission, all stocks of frog and switch material along the line shall be carried in stock and charged out on semi-monthly or monthly reports from the track department as to actual applications, such material to be included in the regular inventories and any discrepancies not previously discovered adjusted in connection therewith.

That stock records be maintained covering such material and monthly checks made to see that all applications are reported.

That material provided for A. F. E. work be carried in

stock and charged to the work on reports from those in charge of actual use; such reports to consist of diaries at completion of small jobs (done in two weeks to thirty days) and semi-monthly or monthly diaries covering material used on large jobs.

That charges as made show price, point of origin, and actual weight of each item.

That an inventory of contract oils and greases be taken the first of each contract adjustment period at all points where such are issued for use and a statement prepared showing the quantities on hand from preceding reports; receipts during the period; total to account for; issued; en route; and balance on hand at end of period, the latter being represented by an actual check.

The difference between the amount on hand by inventory and the amount on hand by total to account for less issues, to be adjusted over the issues, on a pro rata basis. These reports to be substantiated by oil requisitions covering issues and receipted shipping notices covering receipts. The reports after being checked, to be consolidated for the entire railroad and one adjustment made on the consolidated report. Report of the oils and greases issued to be made by classes of service to the oil company at the end of each period. The oils and greases used for breaking in locomotives, and for the initial packing of boxes, to be included in issues.

A tentative schedule of bases for second-hand prices was submitted to the convention and will also be submitted to the Association of American Railway Accounting Officers.

The report is signed by H. C. Stevens, H. H. Laughton, D. R. Elmore, C. A. Miller, W. E. Brady and W. L. Hunker.

Discussion.—Several members did not agree with the percentages given by the committee. The report was referred back to the committee with instructions to substitute for the list given, a price for second hand material of 100 per cent of the new cost, less the cost of repairs, except on certain specified items.

MARKING OF COUPLERS AND PARTS

The committee on the Marking of Couplers and Parts presented a progress report. The committee has been in communication with the manufacturers, and many items included in the 1915 report have been eliminated due to obsolescence. The members feel that all manufacturers should use the numbers recommended by the committee, placing them on the castings instead of the present numbers.

SCRAP AND SCRAP CLASSIFICATION

A number of inquiries were made as to the disposition of scrap glass. The result of the committee's investigation developed that there is a market for scrap glass and it can be disposed of in accordance with Item 85A—R. S. A. standard scrap classification. This glass must be clean in every respect; if any colored or dirty glass is mixed with the clear glass, the purchaser will not accept it, as it does not pay to re-handle it.

If a carload lot can be accumulated from time to time it can be disposed of at any glass works. All of this glass is sold f. o. b. works and will net from \$2.50 to \$3.50 per ton. In large cities there are generally one or more scrap dealers who will take glass, delivered in small lots, netting about \$1.00 to \$2.00 per ton, according to the market price.

It is the opinion of the committee that close supervision should be given to the handling of glass, and that it should be disposed of under rigid specifications in order that a loss will not result.

Scrap paper, such as accumulated by railroads, is worth from \$7.00 to \$10.00 per ton disposed of to scrap dealers, etc., in cities where it is accumulated.

By the proper supervision in handling of scrap paper a considerable saving can be made. In large cities a contract can be made with some dealer to furnish sacks, and a place

set aside so that all paper from offices can be accumulated and put in the sacks belonging to the dealer. The dealer comes at intervals for the paper accumulated, leaving empty sacks to take care of further accumulation.

There is on the market a baling press for scrap paper which could be located at some large outside freight house and agents could save all paper, then forward it to this point in local shipments by sacks. It could then be put in this press and baled from time to time. This press could be stationed in one corner of the freight house. It is absolutely fire proof, made of metal and compresses bales weighing from two to three hundred pounds. After bales are pressed they are easily disposed of.

Where railroads are operating supply cars it would not be necessary to install a press at the larger stations, as outlined above, but agents could accumulate paper and hold it until the supply cars arrive. One of these presses could be installed in the supply car which could compress the paper and as fast as bales are accumulated they could be disposed of to the market direct.

The report is signed by W. Davidson, F. D. Reed, W. A. Linn, LeRoy Cooley, C. C. Dibble, A. R. Dale, and R. L. Morris.

Discussion.—The members were urged to adopt and use the association's scrap classification. Some roads are selling scrap electric lamps, but the economy is doubtful owing to the difficulty of collection.

DISMANTLING OF CARS

By J. W. Gerbre,

General Storekeeper, Southern Ry.

This paper is based on our experience in dismantling approximately 2,600 cars during the past four months. We began the work by hand, in a limited way, and as an experiment, about one year ago, so that when the order was received to dismantle 1850 cars, and complete the work within 60 days, we had some knowledge of what was ahead of us.

The cars were unequally distributed at divisional points, the lowest number at any point being 1, the highest 539. Additions were made from time to time to the original assignment of 1850 cars, the total having reached 2,900 to date, of which 2,600 have been dismantled as of May 1.

In doing the work the regular storehouse organization was used, requiring the addition of only common laborers to the regular labor forces. It was desired that special records be kept of the salvage derived from the cars, and at the points where any considerable number of cars were to be dismantled, special traveling auditors were assigned to the work in connection with their other duties. The material to be saved for the construction of other cars, or for use in repairs to cars, was passed upon by inspectors of the mechanical department, and every effort made to save all the material for which service could be found.

While there was some variation at the different points in the method of dismantling the cars, the general plan was about as follows: Where possible, one or more tracks were secured that would hold from 10 to 20 cars each, the cars being spaced about ten feet apart. Four men were assigned to each car and the work on box cars was begun by two men stripping off the roof and two men removing the grab irons, brake staff and outside metal. The men removing the roof, before leaving the top of the car, loosened the siding at the plate, using for this purpose chisel-pointed bars. After removing the roof, outside metal and doors, the four men take down the lining, loosen the belt rail, and remove the siding. The upright rods are cut at the floor level, the longitudinal rods are taken out, the frame work is thrown to the ground and the rods still remaining in the frame are driven out. Two men remove the deck while two men take down the draft rigging and remove the air brake material. The bolts are drifted from the sills and the

sills rolled to one side of the truck and turned over to the clean-up gang. If the trucks are to be dismantled, that work is done by the four men, if not, the gang is ready for the next car.

It has been our experience, in removing the siding from box cars, that the greatest difficulty lies in getting the material off in such condition as to be of some future service, and at the same time not to expend too much money in the work of taking it off. The largest use we have found for the siding is in re-working it for roofing boards, and while the length of the siding is sufficient to allow of some waste in cutting for roofing boards, it is necessary to remove it with either chisels or chisel-bars, as a man using a sledge hammer will produce mainly scrap wood.

The number of men in the clean-up gang varies with the local conditions, and if any considerable number of cars are to be taken down, consideration should be given to the location of the tracks on which the cars are to be dismantled, and the facilities for taking care of the lumber and metal reclaimed from them. Our best results were obtained with the following organization: One foreman; seven gangs of four men each taking down cars, and twelve men in the clean-up gang, a total of one foreman and forty men. Cleaning the track, assorting the metal, classifying and piling the lumber was done by the clean-up gang. This organization would dismantle not less than seven cars daily, working nine hours per day; while, as the gang became more efficient in the work the time of taking down the cars was reduced in many cases to 32 hours, or the time of four men working eight hours each.

What does the work of dismantling cars cost, and does it pay? It is not my intention to state the cost of labor in dismantling a car, but rather to give the number of hours in which a car can be dismantled, and any one interested in the problem can then apply the necessary labor rate.

Estimating the second hand lumber reclaimed at only 1,000 ft., board measure, per car, and at a value of \$10.00 per 1,000 ft., the lumber reclaimed from a box car will more than pay for the entire cost of dismantling the car and the handling of the serviceable material and scrap. To the saving effected by the second hand lumber there can be added at least \$1.00 per car for scrap lumber. There is a good demand for the second hand lumber. Freight car siding is cut to roof board lengths and is also used for the sheathing of buildings. Car lining is used for sheathing; car sills for foundation work and framing; and car decking for platforms. Material for a transfer shed, requiring about 325,000 ft. of lumber, was supplied by using reclaimed freight car lumber.

Additional savings will suggest themselves to any one familiar with the conditions of the metal from burned car bodies. Not only are the bolts, nuts, washers, forgings and castings in much better condition for use, if serviceable, but on the completion of the work of dismantling the cars you have all of the material, both serviceable and scrap, assorted and classified. This makes a saving of at least \$2.00 per car.

In conclusion, the dismantling of cars is no longer an experiment, it having been demonstrated that savings can be effected in comparison with the burning of the car bodies, the reclaimed material having a value very much in excess of the entire cost of the dismantling of the cars.

Discussion—The discussion brought out the fact that the store department of the Lackawanna has been for some time dismantling freight cars, the lumber being used by the mine department.

FILING OF CORRESPONDENCE

By W. C. Hunt

An ideal filing system where every letter and every record can always be found is often advertised, but it has not been

our good fortune to come in contact with such a system and for an office where there is a large volume of work, we do not believe such a system has been invented. There are, of course, various plans in use and they all have good points, consequently this is a subject which can be discussed from various angles.

The more simple we make the filing method, the more easily it is understood, but to make even the simple plan work we must supplement it with competent clerks in the filing room and with the proper facilities. A filing system for a store department must have a wide scope, as not only correspondence regarding material and accounting must be handled, but a great many other subjects come within the boundaries of this department.

Most of our correspondence troubles, it seems to me, are due to lack of supervision and a realization by the people who handle it of its importance. We know how annoying it is to call for a file of correspondence or a record and after search has been made to be told "It cannot be found"; or on the other hand, to have another department call for a reply to one of its letters and have to tell them "Cannot locate—Please send copy." This means waste of valuable time, and in most cases I believe it will be found that the system is not so much at fault as is a lack of proper supervision.

Because we experience these difficulties does not necessarily mean that we ought to try a new plan or make a very radical change in our old one. To do this simply adds confusion and a further difficulty in locating papers after a little time has elapsed. You cannot always keep the same man in the filing room and changes are always occurring in the personnel of a large office. It is my belief, therefore, that any plan which has been given some thought in its original construction, with relation to the requirement of the department, will prove satisfactory, if it is given necessary supervision. We ought to analyze these troubles to see why they occur, teach the stenographers and others who handle correspondence the importance of placing proper filing references thereon, and to handle them promptly.

I would like to outline the method we have been using in the store department of the Atchison, Topeka & Santa Fe for a number of years. We have had our troubles but we did not discard the whole plan on account of the minor difficulties. We analyzed and corrected them as they came up, until we feel that the system now covers our requirements and we experience little trouble.

The method we are using is one which covers the entire store department of the railway, from the smallest division store to the largest general store and the details pertain to our general store at Topeka, where we are receiving and sending on an average of 700 letters and telegrams per day, 225 invoices, 400 requisitions from the store and operating departments, to say nothing of all the mechanical departments' requisitions, various reports, etc.

Foremost, in any system, is the matter of supervision and we have provided this by having what we call a head filing clerk, who has three assistants, a mailing clerk and under him also comes the office boy who distributes the correspondence to the different desks, etc., after it has passed over the chief clerk's desk. All incoming mail goes to this filing room where it is opened, stamped and all correspondence pertaining thereto attached. All outgoing mail passes to this room for placing in envelopes and addressing, thus conserving the use of envelopes.

This method insures always having someone in the filing room who is familiar with the records and the method employed. The expense of maintaining this may seem large but it is small compared with the time lost under the old method of letting high priced clerks spend a great deal of their time looking for records.

Under our actual filing method, all subjects are arranged

alphabetically and each subject is given a number. These subjects are sent, in printed book form, to all stores and we have endeavored to cover each class of material, report and statement under its respective subject. We have found that we can cover practically all subjects in less than 600 numbers and under any subject where the amount of correspondence is voluminous we make a further separation, arranging such separation alphabetically.

As an example of how this plan is arranged under the alphabetical and numerical arrangement, file No. 1 is Abrasives, No. 2 Acids, No. 3 Air Brake, No. 14 Locomotive Parts, No. 21 Mechanical Lumber, No. 22 Bridge and Building Lumber, and so on, until we reach No. 584, Zinc. These subjects are also cross indexed, as under the alphabetical arrangement, the same class of material may properly appear under two different letters. To make this clear, we will take file No. 1, Abrasives; the subject covers a number of articles and under it ground emery will appear under the letter "E," file No. 1; Pumice Stone under the letter "P," file No. 1, and so on, until each class of material is covered. In addition to the printed book of these references which is sent to each store, a copy is furnished each stenographer, thus insuring all correspondence being carried under its original number and subject to its completion.

It would seem under the method outlined that some of the files would become exceedingly large, but as I have before stated, we get around this difficulty by arranging the file alphabetically under its respective number where the amount of correspondence warrants.

We have further divided this system into two parts, one which we call the "Open File" and the other the "Closed File." Under the first heading, we keep under the jurisdiction of the filing clerk all correspondence that is awaiting a reply or is not complete. In this way a systematic check can be kept on correspondence which is not closed and also a regular follow-up plan maintained.

Under the second heading we keep all correspondence which is closed and is of no further use, except as reference. This closed correspondence is also kept under its proper date order. We follow this plan further when incoming mail has been opened, stamped and files pertaining thereto attached; it is passed over the desk of the chief clerk for check and distribution. This enables the chief clerk to keep posted on everything that is going on, as the files are complete when they pass over his desk. At the same time the filing clerks can be held strictly accountable for all the records. Under this plan, of course, no clerk is allowed to keep any files or closed records on his desk. They must all be sent to the file room to be placed either in the "Open" or "Closed" file.

To work this method it is necessary to have the proper facilities and these we have provided at our general stores by having a separate filing room. These rooms are arranged with shelving, cases, etc., to take care of our needs. Neatness is one of the essential points in any filing room and to instill this into the minds of the people who handle this work, we paint all shelving, cases, etc., with white enamel and provide them with the other necessary facilities, such as proper filing boxes to take care of the letters, requisitions, invoices, reports, etc.

In this room we keep all duplicating machines for getting out circular letters, bulletins, etc. Also have a binding machine for binding reports, requisitions, invoices and other records. One thing which we attempt to do is to allow nothing to be tied into bundles. We bind everything we possibly can and properly stencil it. At the end of each year's business we bind all requisitions, invoices, etc. You cannot lose a requisition or an invoice in this manner and it can never get out of its proper place.

STANDARDIZATION OF TINWARE

W. F. Jones, New York Central, chairman of the committee on Standardization of Tinware, presented a final report stating that the standards of the association and those of the Master Mechanics' Association were now identical and that they would be found in the 1915 proceedings of the latter association. All roads were urged to take immediate steps to adopt these standards, as considerable savings can be realized because of the ability of the manufacturers to manufacture in large quantities and stock the various items.

COMMITTEE ON RAIL

There is a general agitation and movement throughout the country, especially among railway storekeepers and railroad material accountants, with a view to discontinuing the long ton of 2,240 lb. in the reporting and accounting for quantities and values of rail received, on hand, and issued, in favor of the short ton of 2,000 lb., as commonly used on other metal products.

The use of the short ton would undoubtedly greatly simplify the recording and accounting for rail, and the committee recommends that the association take up this question with the other associations representing the engineering and accounting departments of railroads with a view to joining them in the ultimate object of discontinuing the long ton and adopting the short ton for rail.

Prices.—New Rail.—Price and value at which carried in material on hand accounts, should be composed of and include: 1—The Purchase Cost; 2—Cost of Transportation; 3—Cost of Inspection; 4—Cost of Unloading to Storage.

All other expense of handling new rail should be disposed of directly to the work orders, jobs and accounts concerned.

Released Rail—

	Lb.	N. T.	G. T.
First Class	1c	\$20.00	\$22.40
Second Class	3/4c	15.00	16.80
Scrap Rail	1/2c	10.00	11.20

Handling.—As the store department does not maintain labor gangs sufficient, or for the purpose, and at points of destination, for the unloading of rail distributed directly to the work, this work should be done by the operating department, and as a rule by the track department through the use of regular section or extra gangs, and the expense involved distributed directly to the work orders, jobs and accounts concerned.

Except where the store department has regular gangs which can take care of the work, the unloading of rail for storage should be handled the same as rail distributed directly, and the expense involved added to the price and value of the rail. Rail unloaded to storage should be piled separately, according to classification, with a sign on each pile showing the class, pattern number, weight per yard, and the lineal feet in the pile. These signs to currently show the exact quantity of rail in the pile.

Except where the store department has a regular gang to take care of the work, the physical handling of released rail should be done by the operating department, and the expense in connection distributed directly to the work orders, jobs, or accounts concerned.

Consignment.—For the sake of uniformity and brevity on the various documents, we recommend that new rail be consigned to the store department, as per the following illustration:

Eastern & Western R. R.,
James Jones, Storekeeper,
Capitolville, La.

Inspection and Classification.—As a rule, inspection is arranged for by the management, or purchasing department,

and done at the mills, and consequently the store department is not concerned, except that the cost of inspecting should be added to the price and value of the rail as carried in material on hand accounts.

Physically, new rail should be classified by properly marking the ends of the first class, second class, and short lengths, at the mill, with designated colors.

For accounting purposes, new rail should be classified in a class as a whole, but separate and distinct from released rail, separate prices being maintained for first and second quality.

Released rail should be inspected and classified at the time of release as "Serviceable," or "Scrap." The scrap rail should be loaded and shipped to scrap yards or directly to the mills on sale orders. The released serviceable rail should be further classified as between:

First—Rail suitable for use in main track.

Second—Rail suitable for use in side tracks, industrial tracks, etc.

Sales.—All sales of rail, new, released, serviceable, or scrap, should be made through the purchasing department and authorized on formal sale orders.

The report is signed by E. L. Fries, B. T. Adams, H. A. Anderson, J. J. Biggs, F. A. Bushnell, F. L. MacFarlane, and H. Scatchard.

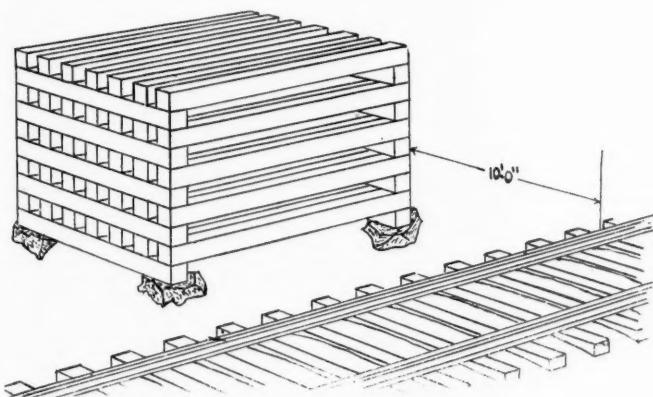
Discussion.—The association favored the adoption of the 2,000-lb. ton and the committee was instructed to take steps toward co-operation with the other associations to bring this about.

TIE COMMITTEE

How to Arrive at an Estimate of Ties Needed.—The supervisor or roadmaster, with the section foreman, should go over the road spotting or marking the cross ties to be removed, keeping account of the ties so marked by miles. To illustrate—from mile post 43 to 44, 200 ties. The supervisor or roadmaster will make a detailed report of the number of cross ties needed, and forward to the proper officer for approval.

Specifications.—Ties should be cut between October 1 and March 15.

All ties must be cut from sound, live timber, free from shakes, loose or decayed knots, or other imperfections that would impair the strength or durability of the timber.



Method of Piling Ties for Inspection

They must have two parallel faces, sawed or hewed smooth, out of wind, with ends cut square.

Cross ties should be not less than 6 in. thick and 8 ft. long. No. 1 ties should have not less than 8 in. face.

Cross ties delivered on right of way for inspection should be in piles of 25 or 50, and cribbed either 2 and 4, or 2 and 7, as illustrated.

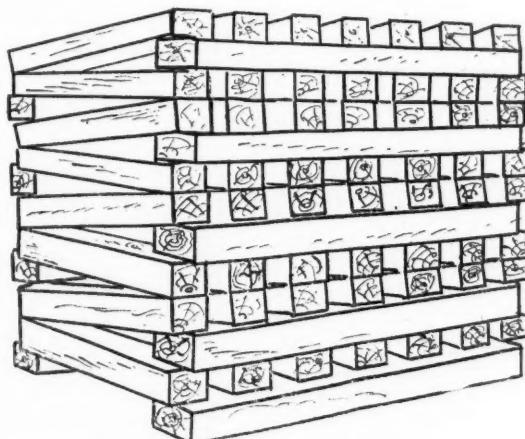
Purchase.—The purchase of ties should be made by the purchasing agent.

Inspection.—The inspection should be under a general inspector, who should have charge of all inspectors. The general inspector should report to a general officer.

Treatment.—All cross ties that fail from decay should be chemically treated.

All roads should have a committee on wood preservation, and on roads that have their own treating plants, the superintendent or manager of timber preservation should be a member of this committee.

Allotment.—The allotment of cross ties should be under



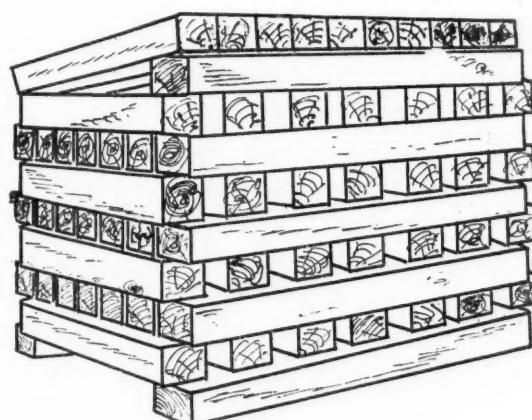
Untreated Ties for Storage and Seasoning, 7 x 1

the jurisdiction of the committee on wood preservation.

Ties should be allotted on the following basis: First—Main Line; second—branch line; third—passing tracks; fourth—yards; fifth—industrial tracks.

Storage on Right of Way.—Untreated ties should be cribbed 7 and 1, as shown in the illustration.

Treated ties should be cribbed 7 and 7, or solid, depend-



Treated Ties for Storage, 7 x 7

ing on the kind of treatment, as illustrated. Piles should not exceed 50 ties.

Inspection of Tie Removals and Disposition.—This should be in charge of an inspector of tie removals, who should report to a general officer. No ties should be destroyed after removal until inspected and disposition given.

The report is signed by J. H. Waterman, Chairman, J. G. Warnecke, O. C. Wakefield, H. E. Rouse, and F. J. Angier.

Discussion.—Moving pictures illustrating the Galesburg (Ill.) treating plant of the Chicago, Burlington & Quincy in operation were shown by J. H. Waterman.

BUILDINGS AND STRUCTURES

The committee found its problems so large and so many that it was possible to give this year only the general outlines to which to work. Drawings of the various buildings were included in the report, which is divided into sections. Section one deals with the various classes of buildings, such as buildings for general storehouse points, buildings for district storehouse points, and buildings for sub-storehouse points.

Section two takes up first the matter of location, which will be governed by the local conditions, cost of the grounds, track facilities, cost of switching, cost of delivering material to and from the shops, cost of insurance, cost of handling, cost of light, heat and power. These should be figured out very carefully and accurately so that conclusions reached may justify the cost. The question of location the committee finds has not been given the attention it deserves. It has too often been the practice to locate all the shop buildings and then put the storehouse in wherever room could be found for it. If the cost of a wrongly located storehouse is compared with the saving of a properly located one, the management will not waste money by improper location any more than they will on any other building.

As regards material to be used in construction, the committee finds that steel covered with concrete is generally accepted as the best construction. It is as strong as any other construction and the steel carrying the weight and being covered by concrete, the strength is less affected by fire than the others. There is not much difference in the cost between steel covered with concrete, reinforced concrete and brick and very little difference in the insurance rate. There is from 25 to 40 cents difference in the insurance on the contents between wood construction and steel covered with concrete, reinforced concrete, and brick. The difference in the life of a building constructed of steel covered with concrete together with the saving on repairs more than offsets the difference in cost for a building constructed of wood.

Floor plans and elevation plans were submitted. The factors entering into the plans are light, cost of handling, and cost of supervision for labor. Cases should be so situated that there will be no dark pockets for the accumulation of material, rubbish, etc. They should be so located that handling will be reduced to the minimum. The standard recommended has the advantage of having natural light in all the pigeon holes, together with minimum handling cost. Some roads' standard plans show an arrangement of the cases lengthwise of the house. This arrangement requires more or less artificial light and its principal advantage is free observation of the whole house by the foreman so as to have labor more efficient.

A basement should be provided of sufficient size to take care of hose and material that deteriorates on account of being kept in too dry a place.

The third story makes an excellent place for the storage of material that does not "move" and for an assembly place for work requiring the holding of the material until it is all assembled for the complete job.

Adequate fire protection should be provided. Where the inflammable material is stored, the committee recommends that the sprinkler system be installed. Fire walls should be installed at least every 100 ft. There are fireproof solutions on the market for awnings that are necessary to put on offices, windows, etc., and where there is any fire risk of this nature, the committee recommends that it be used.

The floor is the most important part of the building. It should be of sufficient strength to carry any load required in the storage of material. The first floor should be one that is not fastened to the building and of sufficient strength to carry at least 500 lb. per square foot. The second floor should carry a load of at least 300 lb. per square foot, and the third floor a similar load. There are a number of good floors on the market. The foundation should be screened

gravel or crushed stone and a good sub-floor of tar with a finished coat. On this may be put a good hard maple floor for trucking, etc. It is very important that the foundation be strong enough to carry the load without any settling.

Ventilation should be given careful consideration, especially for materials that are affected by heat and moisture. A large part of the electrical material should be kept where it is dry and the heat and ventilation should be arranged accordingly for it. The committee feels that a storehouse should be heated so that it is comfortable for the laborers to work in any part of it without wearing clothing that hampers them in their work. Lighting requires careful consideration. Sufficient lights should be provided so that there are no dark storage places for material. During the daytime natural light should be so arranged that this is accomplished.

Elevators of at least two tons capacity should be provided for every 20,000 sq. ft. of floor space. Chutes from one floor to another are inexpensive, handle material rapidly and pay for themselves in a short time. They are rapidly growing in favor. Gravity rollers should be installed for bar iron and material that it is possible to handle on them. There is from 25 to 50 per cent labor saving by their use in handling material.

The committee recommends that in a one-story building the office be at the front of the storehouse, of sufficient size to accommodate the help required, allowing 64 sq. ft. for each clerk required and separate rooms for the storekeeper and general foreman. A room of sufficient size should be provided for meetings of the force. In buildings of two stories or more, the committee recommends that the office be on the second floor.

Ample spaces should be provided to take care of the receiving and shipping. These should be adjacent to each other but divided by a partition so that it is not possible to mix material in the receiving room with the shipping room or vice versa. They should be connected, however, with a door in order to save handling of material that is received only requiring checking in when it is ready for shipment. These rooms should be provided with necessary elevators, chutes, etc.

The committee recommends metal cases with adjustable units. The cases for storing material should be 5 ft. wide at the base, 3 ft. high, with an offset of 12 in. on each side and then 3 ft. high at the top. These should have partitions in the middle making them double cases. The adjustable units will give the desired size of pockets. The height of the case will depend on the storage space available. It is cheaper to run the cases to the ceiling and store material on the top shelves, that are little used, than to provide additional floor space for cases that are not over six feet in height.

A platform should extend around the entire storehouse, not to exceed eight feet wide. This should be of concrete, or planked lengthwise so the trucking will be easier on the labors and the material in the platform. This platform should be covered with a canopy in climates where the rainfall warrants it. There is a large amount of time lost and material damaged in unloading across platforms not properly protected.

The finish of the inside of the storehouse should be light in color to get the best distribution of light.

Assembly rooms should be provided, in case of two or more stories on the top floor, for materials for work that is necessary to assemble to ship complete. These assembly rooms should be of sufficient size to take care of several large jobs.

Casting platform.—The casting platform should be located adjacent to the storehouse, preferably running parallel with it. The retaining wall should be of concrete, the retaining walls fitted with sand and the floor laid on this filling. The floor should be in nowise fastened to the retaining walls. Sufficient racks should be provided for proper storing of the castings. It should have an overhead traveling crane the entire length.

This crane should also cover the track serving the platform so as to reduce the handling of the castings from the cars to the platform to a minimum.

Iron Racks, Pipe Racks, Etc.—Local conditions will govern the location. For sheet iron the committee recommends that the sheets larger than No. 10 be stored outside except where the climatic conditions prevent. The steel should be stored on edge. The racks should be made with steel posts and the posts embedded in concrete.

Oil House.—The location of the oilhouse will depend on track and switching facilities. It should not be located within 200 ft. of any other building. The committee recommends that the building be constructed of concrete, or steel, covered with concrete. Tanks of sufficient capacity should be provided. Tanks for the oils affected by temperature should be located in the basement. Tanks for oils not affected by temperature, when ground space is available, should be located outside, elevated sufficiently high so that the oil will go by gravity to the oil house. An opening should be provided large enough to remove any tank that is in the basement. Repairs to tanks should never be made in the basement or in the oil house as there is always more or less gas in the oil which easily ignites.

Self measuring pumps are recommended but in most cases their excessive cost is not warranted by the saving made. There are a large number of enclosed pumps, that are economical and efficient, on the market at the present time. In no case should pitcher pumps or a pump that leaks oil around the piston or delivery spout be used. Sufficient space should be provided in the oil house for the storage of waste.

Where it is necessary to maintain mixing vats in the oil house and machinery for reclaiming grease, pressing it, etc., a separate room should be provided for this purpose.

A live steam system of fire protection should be installed in all oil houses; also pails of sand should be accessible to put out small fires.

Paint Store.—Wherever possible this building should be a part of the oil house. Where not possible a concrete building should be provided. The committee recommends that this be made of concrete fireproof construction throughout. Shelving, bins, etc., should be made of steel. Live steam fire protection should be provided together with necessary pails of sand for small fires.

Cement Shed.—Cement sheds should be located in the material yard. Local conditions will govern. The buildings may be of wood construction with a telescope floor. The roof should be fireproof and adequate fire protection provided. It is not necessary to divide the cement shed up into any rooms only such as the construction of the building requires.

Lumber Shed.—This should be located in the material yard with sufficient tracks so that switching and handling will be reduced to the minimum. It should be built of wood and of sufficient size to keep protected all finished lumber. The committee finds there is a larger waste of lumber on different roads on account of insufficient lumber sheds.

Building for Explosives.—This building should be placed not closer than 300 ft. from any other building. It should be of reinforced concrete with sufficient room for storing the different kinds of explosives it is necessary to carry with proper handling devices so that all unnecessary jar will be eliminated.

Sheds for Coal, Coke, Charcoal, etc.—Should be located adjacent to where the material is to be used. They should be constructed of fireproof material, either concrete or brick and divide into rectangular bins, so that the measurements may be taken of the quantities in them at any time.

In the standard plans submitted, the committee has not attempted to show details as these will have to be worked out in each individual case.

The last section of the report deals with such matters as cost of construction, insurance, etc., which necessarily vary.

The report is signed by D. C. Curtis, chairman, E. E. McCracken, G. A. Secor, G. J. Fleisch, L. O. Genest, F. H. Potter and J. E. Dexter.

RECLAMATION

Reclamation has become one of the biggest words in store department work and the possibilities of enormous savings are becoming more apparent every day.

The storekeeper is the pioneer in this work, but on many roads the reclamation work has been started by him and turned over to the mechanical department for the reason that facilities were needed and by the argument that it would require a duplicate organization to do this work under the store department.

Before the storekeeper began this work, it was attempted in the shops, but was objected to for the following reasons:

First: The shops were organized to turn out power and could not break into their regular work.

Second: The cost of reclaiming with high priced mechanics would show no saving.

Third: Their supervision was given to turning out locomotives and cars, and this work must have first consideration.

Fourth: Reclamation without organization, and where considered secondary, without proper methods regarding costs and overhead, is expensive.

These arguments are admitted as true and are the strongest recommendation for a separate reclamation plant where the work can be efficiently handled, supervised, inspected, and costs given proper consideration. If the work is handled by the storekeeper, he will see that the material that is needed is reclaimed so as to prevent in every way possible the purchase of new material.

Supervision.—The handling of scrap on practically all roads is under the store department. Scrap is carried in the storekeeper's accounts and sales are made through him. The proper sorting and reclaiming, therefore, simply means the expanding of this work.

When sorting the scrap to classification for the purpose of obtaining the highest price, it is only necessary to have men who are acquainted with material to pick out the serviceable parts. The store department have men who are acquainted with material for all departments and are therefore valuable for this work.

Inasmuch as the store organization is provided with the necessary records, as regards the amount of material on hand and the amount used, it can be seen that there would be no money wasted in picking out material that was already in stock, surplus or more than needed, and instead of reclaiming useless material, will quickly turn this into money.

The store departments are already trained in the proper accounting and prices, and are placed in the position where they cannot reclaim material unless such work shows a profit. The users of material would always rather have new than second-hand, but when this material is handled by the storekeeper he will see that second-hand material is used first and in this manner provide an outlet for all that can be reclaimed and used.

The final measurement of a store department is its purchases, and it is interested in the use and any abuse of material. If this work is handled under the store department, a large percentage of the work and the handling of reclaimed material can be done by the regular storehouse force and by laborers and handymen. It is necessary when this work is handled by the mechanical department to do a good deal of it with mechanics and, in fact, the shop crafts would demand this work if done in the shops. Railroads, therefore, make a serious mistake in not taking advantage of using cheap labor in this work.

Handling and Sorting Scrap.—No railroad should sell

scrap unassorted. Someone must sort and classify it before it is used and large quantities of serviceable material can be reclaimed from almost any car of scrap that will pay for the sorting.

Many scrap docks have just grown and the costs of doing the work have not been carefully considered or kept. Where from two to six thousand tons of scrap is handled per month, as is the case on the average road, the saving of ten cents per ton is no small item. Every road should keep these costs accurately so that they can be compared with other roads which have facilities, cranes, etc., and be able to show the savings which can be made by having the proper tools and facilities for doing the work.

The following statement showing costs of handling scrap will be of interest. It will be noticed that the roads that have gantry or overhead cranes are able to handle scrap cheaper than those equipped with locomotive cranes. The committee felt that these figures would be of interest to those roads which desire better facilities, cranes, etc., and which desire figures that will show what can be done.

STATEMENT SHOWING COST OF HANDLING SCRAP

Road	Cost per ton, old method	Cost per ton, new method	Average tons handled monthly	Cranes with Magnet
A	\$0.40	\$0.20	2,880	1 Gantry
A	.42	.37	7,000	1 Locomotive Crane
B	.50	.16½	6,000	2 Gantry
C	.57	.44	6,000	2 Locomotive Cranes
D	.52	.38	3,000	1 Locomotive Crane
E	.50	.40	4,000	1 Locomotive Crane
F	.80	.60	2,500	2 Locomotive Cranes
G	1.25	.42	2,550	1 Locomotive Crane
H	....	.58½	2,000	2 Locomotive Cranes
I	....	.61	6,000	3 Locomotive Cranes
J	....	.24%	9,500	2 Locomotive Cranes

Road "A" has two plants and one equipped with Gantry crane reduced the cost 20 cents per ton.

Reclamation Plant.—In order to efficiently handle scrap, to know exactly what is being spent and to have the necessary supervision and force, it is desirable to have one reclamation plant on the average road, if the geographical location will permit. Local reclamation many times is carried too far, as no cost account is kept of the work and it is not properly supervised or inspected.

Centralized plants only will justify machinery and organization and keep a force constantly employed. Where material can be reclaimed at point of origin in the shops, cheaper than at the reclamation plant, it should be done, but there is great danger of duplicating work at point of origin as the work is not under proper supervision, and there is a tendency to work high price men. This work is also of secondary importance to the shops and does not receive the proper attention as regards costs, etc.

In laying out the reclamation plant, it should be designed so that the work will be progressive, in other words, so that the scrap will move one way and the good material go at once to racks conveniently located and the material for reclamation move toward the proper machine without rehandling.

Many reclamation plants have just grown and are subject to criticism on account of the extra rehandling. Future needs should be considered so that as the different machines are added the whole plant will work as a unit.

The committee presents the following list of tools which are needed on practically every railroad handling even a small amount of scrap. These tools are in use at all points which have been doing this work and will save the greatest amount of money for the investment:

1—Alligator shears for general run of scrap—motor-driven.....	\$1,500
2—Vise, forge, emery wheels, small tools, for repairing jacks, drills, shovels, etc.	100
3—Brass magnetic separator—motor-driven	300
4—Small shears for rounds and bolts—motor-driven.....	450
5—Small hammer, shop made—air.....	100
6—Bolt cutter—motor-driven	780
7—Nut taper—motor-driven	600
8—Spike straightener, shop made—air	100
9—Coil spring reclaiming plant.....	350
10—Re-babbitting journal bearing	250
11—Brakebeam repair plant	400
12—General utility hammer—motor-driven.....	600

13—Acetylene cutter and welder.....	\$2,000
14—Washer machine—motor-driven	2,000
15—Iron reclaiming rolls—motor-driven	9,400

The committee has investigated these prices and knows that the amount shown will provide a suitable tool for the work.

Several hundred dollars per month can be saved by picking out good bearings and relining them. Many journal bearings can be reclaimed by the use of a cheap patented boring machine, which can be purchased for less than \$200 and many roads are making good savings along these lines. While it is better to have a broaching machine with which to bore these out, large numbers can be relined with cheap facilities.

If brakebeam work is done at the plant, it is not necessary to transport beams to and from the shops, or have any extra handling of the scrap. A good furnace for heating and a plate for straightening is about all that is required. The work is such that good handymen can do a first-class job. No refitting is necessary as parts for each beam interchange.

Acetylene cutters and welders can be used for many purposes and, while a general plant is the best, cheap portable plants can make big savings in cutting up large trusses, etc., and in welding and building up many articles. Close attention must be given this work, as it is expensive and many roads are curtailing its use.

A good washer machine will save its cost in a few months. Cutting miscellaneous scrap and flues is severe work and a good strong machine should be secured, which can also make other specialties.

Iron reclaiming rolls are particularly desirable at this time on account of the high price of iron and poor delivery. Any road that has sufficient accumulation of scrap that will re-roll should not be without one. Any shortage of iron that a reroll will handle can be quickly placed in stock. It is particularly desirable to have these rolls near the reclamation plant to save all extra handlings of both the scrap and the output.

The first twelve tools can be placed in the most temporary kind of building, built from scrap lumber and sheet and practically every tool will save its cost in from 30 to 60 days.

Brakebeam repair shops and reclaiming rolls require supervision to handle them, but there is no reason when the first nine tools are installed along with such work as repairing track jacks, drills, rehandling shovels, remounting hose, rebabbitting bearings, why an organization will not be sufficiently large to have proper supervision and inspection to efficiently handle brakebeam work and rerolling.

The following lists are given as a guide to show what is being done on different roads, and what can be done with only a small investment, as outlined in the list of tools:

ROAD A		Average amount per month
Savings made by—		
1—Reclamation and sorting out car material.....		\$10,000.00
2—Reclamation and sorting out mechanical department.....		450.00
3—Reclamation and sorting out roadway material.....		800.00
4—Reclamation of bolts.....		400.00
5—Reclamation of nuts.....		50.00
6—Reclamation of shovels.....		2,700.00
7—Reclamation of springs.....		Included in Road Material
8—Reclamation of track spikes.....		1,700.00
9—Reclamation of bar iron.....		4,000.00
10—Reclamation of paper		100.00
11—Reclamation of brakebeams		3,253.00
12—Reclamation of hose		17.64
13—Reclamation of washers		3,130.02
		\$20,200.00

ROAD B		
1—Reclamation and sorting out car material.....		\$ 6,913.08
2—Reclamation and sorting out mechanical department material.....		2,328.66
3—Reclamation and sorting out roadway material.....		1,587.90
4—Reclamation of bolts		1,633.42
5—Reclamation of nuts		1,221.89
6—Reclamation of springs		577.49
7—Reclamation of bar iron		124.04
8—Reclamation of brakebeams		3,253.00
9—Reclamation of washers		17.64
10—Reclamation of wrot iron		3,717.32
11—Reclamation of hose fittings		3,130.02
12—Reclamation of waste		252.73
		\$24,758.03

ROAD I

1—Reclamation and sorting out car material.....	\$48,273.85
2—Reclamation and sorting out mechanical department material.....	
3—Reclamation and sorting out roadway material.....	
4—Reclamation of bolts	2,145.86
5—Reclamation of nuts	782.38
6—Reclamation of shovels	286.97
7—Reclamation of springs	808.72
8—Reclamation of track spikes	457.00
9—Reclamation of bar iron	2,876.02
10—Reclamation of paper	899.23
11—Reclamation of brakebeams	
12—Reclamation of hose	
13—Reclamation of washers	139.22
	\$56,669.25

The committee has the necessary data regarding costs of tools and savings which can be made, in case any storekeeper or railroad is figuring on general reclamation work where a large or complete plant is desired.

These would be divided into three groups as follows:

For Yard—Large alligator shears, magnet crane, casting drop, skips or buckets for handling scrap.

For Bolt Shops—Shears, bolt headers, bolt threaders, hammers, nut tappers, washer punch.

For Blacksmith Shop—Large power hammer, small power hammer, forges, bulldozers, spring tester, punch, emery wheels, power saw, rolling mill, furnaces, fans or blowers.

General—Magnetic separators, cinder washers, reabutting bearings, tin shop, hose room for mounting steam and air hose, stripping machinery, sewing machine for repairing sacks where used.

The inspection of material is a very important item and unless this inspection is carefully made, the statement from other departments that the work is inferior will have its effect. It is, therefore, especially desirable and necessary that all items reclaimed be inspected in the most thorough manner.

Many times complaints are made that reclaimed material is not satisfactory, and often the blame is placed where it does not belong, as the reclaimed articles may be picked out of some car or repaired at local points. It would appear desirable to have knuckles, couplers, parts and similar articles dipped in some cheap asphaltum mixture so that if correct, these difficulties could be remedied; even though material is first class, it will be used much quicker if it looks like new.

Managements of railroads have been fooled so many times by figures that do not represent facts, that it is necessary that the proper accounting be instituted that will bear the most rigid scrutiny, and if necessary call on the auditors to check the work so that they may know and you may be assured that your management respects the figures which are furnished as being accurate in every detail and that they cover overhead and all other charges and are real savings.

Cost of reclaiming, which includes all costs, is the governing factor and must include all costs of handling actual costs of reclamation, interest on investments, and the item must be satisfactory after being turned out.

It has been found to be a good thing to arrange visits of master mechanics, shop foremen and heads of departments to reclamation plants so that all may observe the loss of having material find its way to the scrap, also be of service in suggesting new ideas.

Reports showing the labor, overhead, total cost and comparison as authorized in last year's report should be made each month so that the management will be aware of the savings being made.

The report is signed by D. D. Cain, chairman; R. K. Graham, J. C. Kirk, A. L. Tucker, H. G. Cook and W. J. Deihl.

Discussion.—D. C. Curtis (Burlington) stated that it was best to use new machinery for reclamation work, as the savings effected were greater than the difference in the cost of new machinery and that of fixing up the old tools. D. Kavanaugh (Western Maryland) stated that, in his opinion, it was

better to start the reclamation work with small items on which it was known that a saving could be effected. This will impress the executive officers and help toward extending the work.

HANDLING OF COMPANY MATERIAL

By Geo. O. Dayton

General Foreman, Store Department, Chicago, Milwaukee & St. Paul.

It is not possible to designate a universal practice or outline any set rule to follow to better conserve the use or expedite the release of cars, that would be applicable to all roads, as the conditions may be of such variance it would not be feasible; therefore the author of this paper has endeavored to treat the subject along the lines of suggestions that occur to him and which are mostly derived from practices he sees followed daily with considerable measure of success. The storekeeper should have before him daily such reports as will indicate clearly the number and class of cars that are in his possession. These reports should show when the cars are spotted and released, the number unloaded, the number and class loaded, the kind and weight of the lading, the number remaining in yard to be spotted, the number of cars held over and the reason, and when any lack of good judgment in selecting and loading cars, undue delay in releasing them, etc., is evident it should be immediately looked into and followed up until a proper remedy is applied. Carefully checking these reports each day will many times reveal conditions warranting an extra switch that will result in releasing other cars that may have lain over until the next day before being spotted. The yard masters and others are ready to work in harmony to conserve cars, especially during the present car famine and there should be no trouble experienced in getting any extra switching done that will be to the company's interest in this respect. There should be noted and reported to the proper officers any cases wherein cars are misused, such as an entire car utilized to transport a shipment of but a few hundred pounds, scrap loaded in box and stock cars for points where it is handled by magnets, which not only delays the release of the car, but costs about ten times more for labor to unload.

There are times when such abuses occur and escape the notice of the proper officer who would not sanction it and would have it corrected if informed of it. The time of switching the tracks should be so arranged as to be consistent with the hours that can best be assigned to the loading and unloading, and to avoid any interference from other switching on or across the tracks after the cars are spotted. All loaded cars should be checked and marked for spotting at the most advantageous point before the switching is done, as the proper spotting facilitates the releasing. Cars for both loading and unloading should be spotted at the place where the major portion of the material is handled and a car improperly spotted should, if possible, be released and not held for the next switch to respot. The cause for the improper spotting should be ascertained and necessary action taken to avoid a repetition. When loading a car for more than one point the material for the first point should be loaded last to permit unloading it without handling any of the material for the point beyond. There will be occasions when the first point will have about the same amount of material for the next point, as unloaded, which can be loaded in the same car and when handled in this manner it practically means the conservation of one car, representing one car unloaded, one car loaded and but one car spotted. It is to a great extent essential in order to expedite the release and properly handle loaded cars to have some advance information as to just what the car contains. A proper shipping notice received in ample time is a material aid in this respect as it permits the one receiving the car to take advantage of the switching and spotting or arranging to forward it to some

other point, if it is subject to forwarding. As an instance: The car may contain 300 kegs of track spikes coming to a point that has an order to ship the same amount, and if it is known in advance, arrangements could be made to allow it to go forward, avoiding the handling, undue delay, or extra switching.

There is a nice field for missionary work on the part of manufacturers, supply houses and others shipping company material to aid in conserving cars by furnishing advance information regarding the shipments they are making. Most of them are very lax in marking and loading material or giving any advance information, which many times causes the car to be held until it can be ascertained just what the material is, requisition it is applying on, or where the car should be spotted, which could be avoided if known beforehand. No car should be held under load over night or beyond the next switch if there is any possible way to avoid it. If by working an hour or so overtime a car, or several of them, can be released from 12 to 24 hours earlier it can be conceded good judgment to do so. In having a careful canvass of the yards at the end of the week and during the afternoons preceding holidays, it can be ascertained what cars are in sight for unloading and if there are enough to warrant it, arrangements can be made for switching and working the forces on a Sunday or holiday, thereby gaining a day or two in releasing them. Such action bespeaks team work and tends toward a more creditable showing in the conservation of cars. A large percentage of company material is such as can be handled in most any kind of car as long as it is safe to run and a class of car that is in great demand should not be accepted for loading if it is possible to procure some other. There should be very few circumstances that would justify the loading of a furniture, carriage, automobile car or box cars suitable for grain and flour with company material, and before such cars are loaded they should be passed on by the storekeeper and meet his approval only after it has been ascertained that nothing else is available.

Stock cars are suitable for such lading as oil in barrels, lumber, track bolts, spikes, nails, wheels, axles, tires, castings, etc., and as long as the demands for this class of car for other service are not great they should be called for. The same holds true with flat and coal cars, and in fact the occasion should be very rare for using any class of car in which a shortage has developed.

When it does become necessary to load a class of car that is in great demand it should be loaded for the territory that can use it to the best advantage.

In handling L. C. L. shipments the regular supply car is a factor in conserving cars. Such material as supplies for agents, tewermen and section men can be shipped once a month, in a car loaded in station order for each division and accompanied by someone from the store department, the roadmaster, the trainmaster or some other employee who will issue the material. A certain date can be assigned for the departure of a car over each division. This is virtually a regular supply car, although not requiring any particular car or one especially fitted up and requires but one or two cars to take care of the shipment of this class of material each month for each division.

By U. K. Hall

Oregon-Washington Railway & Navigation Company.

It behooves all concerned to be vitally interested in obtaining the best means possible to facilitate the prompt loading, unloading and routing of equipment in order to obtain the very best service from it. Naturally, the best method is:

First: One that will permit of proper spotting or switching of cars and the best means or method to most quickly unload material and release the cars.

Second: One that will permit the loading to the fullest maximum capacity in order to prevent hauling of light tonnage, and

Third: One that will route a car in the direction where that particular car can be used to the best possible advantage.

Taking up the questions in more detail in the order given:

First: Check should be made of the yard the very first thing in the morning and cars should be marked or carded to place or store where they will be unloaded. Arrangements should be made either in conjunction with the yardmaster, or if the switching is done by the store itself, with the necessary parties, to spot the cars at the exact point or nearest the point where material will be stored or handled to eliminate unnecessary handling to quickly release the car. In case of consolidated shipments or shipments intended for storehouses in various points of the yard, say, for instance, at the main store and at an iron house somewhat remote, the car should first be spotted at the store where the material in the car is so loaded that it can be easiest or most handily taken out. Arrangements should then be made to have the cars switched to the second most advantageous point to complete the unloading. If, on the other hand, there is not sufficient material to warrant second switching of the car, material should all be unloaded at the first or central point and the material transferred by push car or otherwise.

Second: Shipments to outside stores or other points should be so consolidated, if for one point, or so arranged for different points to permit of fullest possible loading in any one car. If the point is of sufficient size to warrant straight carload shipments, this is a comparatively easy matter. Naturally, the best method to be followed is the consistent use of stock books and the rendering of monthly requisitions for replenishment of stock, as this will enable larger shipments at longer periods. However, as a rule, the shipment of monthly supplies can be so handled as to obtain the nearest to a maximum carload—it is the shipment of emergency supplies to stores between regular periods and the shipments to engineers, maintenance and operating forces that present the greatest difficulties along these lines. There are two ways to handle this proposition, at least, under the organization of our own road; first, by the loading of supplies for various and sundry points in one car to be shipped to the local freight sheds. From the local freight sheds there are merchandise cars being shipped to practically all points daily, and this material could thus be transferred and loaded in these merchandise cars, which cars are usually loaded nearest to maximum capacity. This, however, causes second handling of material in the transfer at the local freight. Or, second, the consolidating of shipments for various points at the general store where shipments are made in the same general direction. As an example, on our road Huntington on our main line is 400 miles east of Portland. If straight carloads could not be obtained, lesser shipments could be made to The Dalles, Pendleton, La Grande and Huntington, all being stations en route. By thus consolidating, usually a carload can be obtained. On the other hand, exceedingly great care has to be exercised that in so loading material needed at Huntington at once will not be so loaded and delayed in transit by the stopping of the car at the other points.

Third: Cars should be routed according to where that particular class of equipment can best be used. When stock is being loaded in eastern Oregon and Idaho for shipment to the coast, naturally this class of cars is in the greatest demand and are shipped out empty, if loads cannot be provided. In such case, therefore, all shipments possible in that direction should be made in stock cars; or, if wheat is being shipped from eastern Washington in box cars, stock cars or others should be ignored completely and all ship-

ments to these points made in box cars. Or if as at the present time, there is a large accumulation of open equipment, foreign gondolas, etc., in which knocked down car equipment has been shipped to this coast; in shipping ties to our affiliated lines it is to the best interests of all concerned to load these ties in nothing but this class of equipment.

Discussion.—This centered mainly on the details of handling cars and the relative responsibility of the stores and transportation departments. The necessity must be kept in mind of quickly releasing cars in order to get them into revenue service.

COMMITTEE ON LUMBER

Inspection.—So far as the committee is able to learn, it is the general practice to inspect lumber at destination, there being but few exceptions to this rule, among which are the Union Pacific, which inspects oak at the point of loading; the Gulf Colorado & Santa Fe, the Pennsylvania Railroad and the Illinois Central.

The inspection of lumber when received should be made strictly in accordance with the grade ordered; such grade having been adopted by the manufacturers' or dealers' association, governing grades in the territory where the stock is purchased; it being assumed that the railway in making the purchases selects the grade to fit its specifications. In cases of special specifications not conforming to the grades governing the territory in which the purchases are made, the inspection should be in accordance with the railroad company's specifications or special grade.

Disposition of Rejected Lumber.—The question of disposition of rejected material was discussed very thoroughly at last year's meeting and it is the committee's understanding that a majority of the members were favorable to declining all compromises with shippers, so far as accepting rejected material at a discount. It is found that on such roads as have adopted this plan, a marked improvement is manifest in the quality and grade of shipments received; there being a marked decrease in the number of rejects, as compared with the past.

Stacking Lumber.—There is a great variation in practice as between the different railroads; and a most decided difference in methods as between the railroad and commercial lumber yards, especially with respect to set rules as regards uniformity in foundations, stripping, height of piles, and their general appearance and grouping of dimensions in proper order. There are few railroads having ideal lumber yards, as in most cases the lumber storage must be arranged to fit local conditions, such as ground space available, track layout, convenience of delivery to shops, switching facilities, etc. The most important factors necessary to the ideal lumber yard are ground space and tracks. It would not be practicable for all roads to adopt the same practice, therefore, the committee recommend for consideration the practice as now in effect on the Gulf Colorado & Santa Fe, quoted from a report from that road as follows:

"All stacks should be from two to three feet above ground, to allow free circulation of air, and should be pitched, the front end higher than the rear end, on a pitch of one inch per lineal foot; thus in piles of 16 ft. lumber, the front end would be 16 in. higher than the rear end. Each piece should be exactly over the piece underneath it, and from 1 in. to 1½ in. apart from pieces on each side, for say 4-in. lumber, and increasing this space up to 3 or 4 in. in lumber up to 12 in. Crown pieces should be the same as the balance of the stack in lumber and timber, 1 to 4 in. thick. In timber 6 in. thick and over, this plan would run the stack too high, and 1 to 2 in. strips of waste lumber can be used. These cross pieces should be put on every layer and about 4 ft. apart and the front piece should project ⅛ to ¼ in.

over the ends to protect the stack from sun and rain. Cut strips of waste lumber 2 in. by 2 in. and then saw these 2 in. square across from corner to corner and each piece will make two pieces that will be satisfactory, or saw pieces 1 in. by 2 in. by 2 in. by 2 in. When the stack is complete, take one piece the same as the balance of the stack and lay it flat on the space between each tier. Some saw mills put an air space 12 in. wide in the center of the stack, which they call a flue; others do not. Probably this is a matter that should be regulated by climate.

"Be sure that the center bearings of each stack are not lower than the end bearing. The lines should be straight to avoid sagging and the consequent accumulation and retention of dampness.

"Be sure that the cross pieces are exactly over each other, or crooked lumber will result. Do not use decayed or rotten lumber for cross pieces or foundations, as doing so will contaminate the good lumber."

Economical Ordering of Lumber.—It is recommended that storekeepers take up with the heads of the various departments having the making of requisitions the matter of specifying the exact widths or lengths in which lumber is to be applied. If this practice were followed out, it would result in a very material saving, as a great amount of lumber could be ordered in random widths and lengths, which can, as a rule, be purchased at a lower figure.

Saving by Re-Sorting and Substituting.—A representative of one of the large systems reports that the road which he represents has effected a considerable saving by resorting from lower grade lumber. One item amounted to \$4,200 during the past year, in sorting V. G. and clear stock from common grades.

Saving Effected by Using Lower Grades.—On two of the systems represented on the committee, a considerable saving has resulted in the adoption of a lower grade of poplar. This grade has been found to be equally as good for the service, as the higher grade stock. It was formerly the practice to use first and second clear yellow poplar. These systems are now using sap clears, which can be purchased at an average of \$10 per thousand less than the grade formerly in use.

Re-Sawing.—A very large saving has been effected by re-sawing, the principal stock used in re-sawing being second hand bridge lumber. The Burlington kept account of the operation of its machine and the saving effected has approximated \$6,000 per year, for the past three years. There is not only a saving in the sawing of the second hand material, but also in the re-sawing of new lumber into odd dimensions, which are not ordinarily carried in stock. The re-sawing done by the Burlington has been principally in connection with lumber used in construction of buildings, stock yard trestles, etc.

Several points should be taken into consideration before locating a re-sawing plant. Perhaps the most important is the amount of available material that may be obtained from old bridges, buildings, etc. Such a mill should also be located as near as possible to the bridge and building material yard in order that the working force may be worked in conjunction with the force that handles the material. Storage tracks should be located convenient to the plant for unloading the material and piling it prior to shipment. The sawmill best adapted to this purpose is known as the "pony" type and can be purchased from a number of manufacturers for about \$250. The saws should be 40' to 44 in. in diameter and have what is known as the inserted tooth. A 30 h.p. engine or motor will furnish the necessary power for such a mill providing the larger machines are not operated at the same time. The sawdust is used in ice houses and sent out to passenger stations for sweeping floors. The cost of handling and re-sawing timbers varies from \$3 to \$5 per thousand

and much of it may be worth from three to five times that amount.

Manufacture of Tie Plugs.—Of the roads represented on the committee, the Burlington is the only one manufacturing tie plugs. It manufactures these at all of its principal plants. The machinery originally in use consisted of table gang saws. Material is made into slabs of the required thickness, double the length of the plug. These slabs are gained in the exact center at right angles to the length, then put through the saw and ripped in from four to six strips, producing eight to twelve plugs, according to the widths of the slabs. The plugs were separated by breaking at the gain, breaking at that point shaping the point of the plug. This process was found not sufficiently rapid to produce the number of plugs required for the season's work. It therefore became necessary to devise different machinery, and the mechanical department constructed a machine by converting a boring and mortising machine for this purpose. This tool cuts and points the plug in one operation, and has a capacity of approximately 200 plugs per minute. The maximum production has thus far not exceeded 1,600,000 plugs per month, on account of lack of material. There are three of these machines in use at this time. The cost of the original machine, including converting and installing, was \$226.

The material used in the manufacture of the plugs is mill waste, sawed into squares of the required dimensions and in lengths from 3 ft. up. The shorter waste is manufactured by the old style process, that is, the gang saw.

Reclaiming Material from Torn Down Cars.—The proposition of reclaiming lumber from torn down cars has not been taken up to any great extent, with the exception of four of the roads represented on the committee. The Burlington has gone into this matter to a greater extent than any of the roads represented. While they have no detailed figures to show the exact saving, by estimating a thousand feet to each car, multiplied by the number of cars torn down during the past year, the most conservative estimate suggests a saving of between \$20,000 and \$25,000. It must be understood that, of the lumber reclaimed, every foot displaces an equal amount of new material. Very much of the roofing goes back in repairs for the same purpose. It is also used for coal doors, sheathing under metal roofs, lining repairs, etc. The lining is also used for sheathing under metal roofs; also roofs for stock cars.

The reclaimed siding is used for original purposes; also for making of end doors, and repairs to side doors. All lining and roofing which is not fit for purposes previously mentioned, is used in the manufacture of coal doors. Flooring is used for repairs in kind; also for decking for hand and rubble cars, sidewalks, platforms and coal door battens. The sills that are reasonably sound are used for sill splices.

The report is signed by James Garrett, chairman; J. F. Ritter, W. H. Clifton, W. S. Morehead, W. H. Thorn, A. L. Tucker, E. S. Newton, C. H. Schneider, F. B. Ashley, and A. H. Young.

Discussion.—Certain questions pertaining to changes in specifications were recommended to the incoming committee on recommended practices. The committee also suggested the elimination of the first three paragraphs of the report on lumber. This suggestion was approved.

OTHER BUSINESS

On Monday a few minutes were given to "Rapid Fire Suggestions" from the members. G. G. Allen, Chicago, Milwaukee & St. Paul, recommended the use of a motor truck and trailers for delivering material. On one road a motor truck is used for delivering heavy material to the shops, while the lighter material is delivered by boys on roller skates.

Paul H. King, receiver of the Pere Marquette, made an

address in which he stated that the commonly accepted reasons for present railroad conditions were erroneous. They were not due to mismanagement or financial manipulation, but rather to low rates and, in the case of the Pere Marquette, to low traffic density also. This road would have been in the same condition today, due to these causes and increasing expenses, had there been no manipulation. Mr. King favors regulation, but feels that it is overdone. Regretting past mistakes will not better conditions. The present situation must be met by an understanding of the community of interests, as the railroad's welfare is the welfare of all.

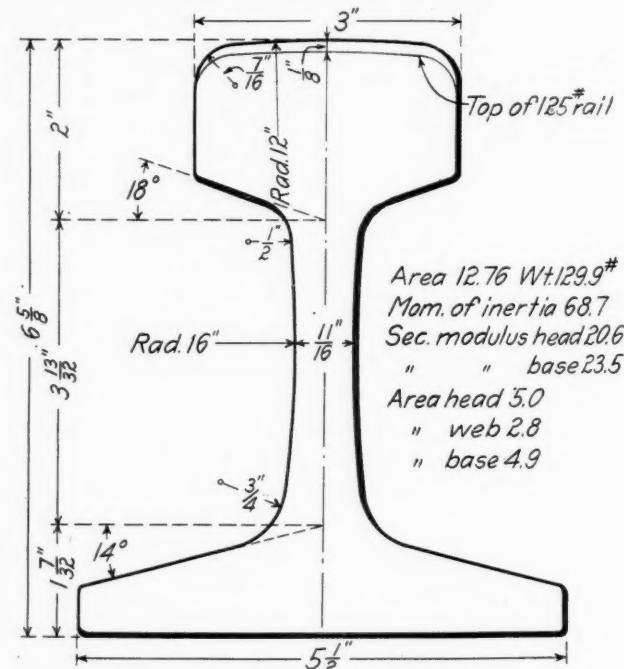
A paper on Rail Mill Operation was read by John Rhiner, foreman of the Chicago, Milwaukee & St. Paul rail mill at Savanna, Ill. It showed that by an expenditure of 70 cents per ton for sawing off ends and redrilling rails with battered or broken ends, which would be fit only for scrap and bring twelve dollars per ton as such, they can be used in place of new steel which would cost \$21 per ton. The value of sawed rails is greater than that of rails relaid without sawing because of the better joints which are obtainable.

The convention attendants visited the Ford plant on Tuesday afternoon. A dinner dance was held the same evening.

Election of Officers.—The following officers were elected: President, W. A. Summerhays, Illinois Central; first vice-president, H. S. Burr, Erie; second vice-president, E. J. Roth, Chicago, Indianapolis & Louisville; third vice-president, J. N. Shaw, Delaware, Lackawanna & Western; treasurer, J. P. Murphy, New York Central.

A 130-LB. RAIL SECTION

Of the recent order for 205,000 tons of rails placed by the Pennsylvania late in April, all but 5,000 tons of the 125,000 tons ordered for the lines east of Pittsburgh will be rolled to a 130-lb. section, and a considerable tonnage of the rails for the lines west of Pittsburgh will also be of the same weight. This section is identical with the 125-lb. section



The New Pennsylvania Rail Section

adopted two years ago except that $\frac{1}{8}$ in. of metal is added to the top of the head, as shown in the accompanying drawing. The new rail will, therefore, use the same fastenings as the 125-lb. section. The Bessemer & Lake Erie has also ordered a considerable portion of its rail requirements for the year, rolled to this 130-lb. section.

AMERICAN RAILWAY ASSOCIATION

The spring meeting of the American Railway Association was held at the Biltmore, New York City, on May 17, with 160 delegates present, representing 250 members.

The membership now comprises 402 roads, operating 282,400 miles of line, and 222 associate members operating 14,515 miles.

The Committee on Transportation in its report strongly urged members to adopt the language of the lately revised Standard Code of train and signal rules wherever possible; also that in printing new books of rules reference be made on the title page to the effect that the rules are in accordance with the Standard Code of the American Railway Association.

The Committee on Maintenance has chosen, to fill vacancies, C. S. Churchill (Norfolk & Western), chairman of the committee in place of A. T. Dice, resigned, and C. L. Bardo (N. Y., N. H. & H.). This committee is reviewing the code of rules governing the determination of physical and educational qualifications of employees. It is not yet ready to report on rail sections.

The Joint Committee on Automatic Train Stops is continuing its investigations, and has issued a circular calling for information as to the latest experiments. Nine railroads are now testing such devices. No designer has yet fully complied with the requisites prescribed by the association. The committee has arranged that small local committees of engineers shall be appointed by its chairman to follow up the tests now being conducted, and report in detail thereon during the next few months, so that the association may be kept fully advised of all progress made in the art, and, if possible, be enabled to aid therein.

The Committee on Transportation of Explosives and Other Dangerous Articles called attention to the ninth annual report of the Chief Inspector of the Bureau of Explosives, which has been noticed in the *Railway Age Gazette* (April 21, page 880). On the recommendation of this committee, the standing resolution of the association in regard to cards permitted on freight cars was amended to cover missing placards or certificates on cars containing explosives and other dangerous articles.

The Committee on Electrical Working reported progress. It is continuing its conferences with the National Joint Committee of Engineering and Operating Associations on specifications for crossings of power and other service wires.

The Committee on Relations Between Railroads presented a report dealing with (a) demurrage; (b) home route cards; (c) car seals; (d) tracing freight, and (e) per diem rule 19. The report is abstracted below. The association approved the committee's action and adopted its recommendations. These include revised National Car Demurrage Rule 1, Section C, and also two new interpretations of these rules; and a code of National Track Storage Rules. The effective date of Car Service Rule 5, relative to continuous home route cards was postponed to January 1, 1917. The rules governing the tracing of shipments, a recommendation concerning charges for the use of cranes and the rules governing the application, inspection, recording and care of car seals were also approved. Per diem rule 19 is so amended (paragraph 2) that the Car Service Commission (Fairfax Harrison, chairman) may institute proceedings against a road for violation of the rules without waiting for a complaint; may act on its own initiative.

The Special Committee on Prevention of Accidents at Highway Grade Crossings (J. A. McCrea, chairman) made a long report, covering an extensive study of this question. This will be given in a future issue. On recommendation of the committee, the association approved the following standards for grade crossings:

- (1) Uniform approach warning signs.
- (2) Uniform color of light for night indication.

- (3) Uniform use of a circular disk, approximately 16 in. in diameter, with the word "STOP" painted thereon in large letters, instead of the vari-colored flags which are now in use.
- (4) Uniform painting of crossing gates alternate diagonal stripes of black and white.
- (5) Uniform rules governing crossing watchmen or flagmen.

The committee was also authorized to meet with a committee of the National Association of Railway Commissioners and other properly constituted committees, and to join with them in recommending standards to be followed in the protection of grade crossings, and to secure legislation in the several states requiring compliance with such standards.

The Special Committee on Accident Statistics, J. Krutschmitt, chairman, reported that since the adoption by the Interstate Commerce Commission, on July 1, 1915, of the revised rules and blanks governing the monthly report of railway accidents, 17 states have consented to receive these reports on blanks identical with those of the Interstate Commerce Commission, namely: Arizona, California, Colorado, Idaho, Kansas, Louisiana, Maryland, Nevada, New Hampshire, New Jersey, New York, Pennsylvania, South Dakota, Texas, Washington, West Virginia, Wisconsin.

The matter has been brought to the attention of most of the remaining states in which detailed reports are required. In many of them, however, there is a disposition on the part of the state commissions to withhold action until practically all carriers within their jurisdictions join in advocating the change. The committee, therefore, recommends that carriers operating in these states file written requests with the state commissions to substitute for the state form such of the I. C. C. blanks as will comply with their requirements, following the request with whatever collective action may be deemed expedient.

W. W. Atterbury, vice-president of the Pennsylvania, was elected president of the association for the ensuing two years; A. W. Thompson, third vice-president of the Baltimore & Ohio, first vice-president, and W. G. Besler (C. N. J.) and W. J. Jackson (C. & E. I.) members of the executive committee.

The following roads were elected members of the committee on transportation: Chicago & North Western, New York Central, Pennsylvania. The following were elected members of the committee on maintenance: Chicago, Rock Island & Pacific, New York, New Haven & Hartford, Vandalia. The following were elected members of the committee on relations between railroads: Chicago, Milwaukee & St. Paul, Illinois Central, Southern Pacific. Denver, Colo., was selected as the place for the next regular session, which will be held on November 15, 1916.

REPORT OF COMMITTEE ON RELATIONS BETWEEN RAILROADS

The Committee on Relations Between Railroads submitted a lengthy report, including a number of resolutions for approval by the association.

The committee has approved the applications of 18 roads to sign the per diem rules agreement and rejected the applications of two roads. It has reported to the executive committee on the eligibility of 15 roads to become associate members of the association.

At the last meeting the committee was instructed to take the necessary steps to secure an increase in the demurrage rate to meet the prevailing car shortage. The report outlines the committee's negotiations with the Interstate Commerce Commission and with the National Industrial Traffic League, which resulted in a temporary increase, from April 1 to June 15, in the demurrage rate on interstate business for cars held under demurrage for three days. A considerable number of state railroad commissions also promptly approved the change, and the committee expressed the hope that the increased rate will do its part in relieving the car shortage and possibly the congestion in the eastern territory. A circular has been

addressed to the roads requesting them to keep statistics showing the effect of the change in the rate.

After conference and agreement with the National Industrial Traffic League and other interests the committee recommended a change in the demurrage rules to provide that demurrage shall not accrue on private cars standing on private tracks when the ownership of the car and track is the same.

The committee submitted a code of rules to regulate the tracing of freight shipments, stating that reports to the association indicate that every year at least 5,000,000 telegrams and 3,000,000 letters are transmitted by the railways in tracing for freight, at an expense of over \$1,000,000; that many railways have been induced to make passing reports and arrival reports to shippers, and that in many cases the time of officers and employees is occupied in the making of these tracers and reports which could much better be employed in expediting the movement of freight. The committee recommended that the association take immediate steps toward the reduction to a minimum of passing and arrival reports to shippers. The proposed rules do not refer to requests to expedite the movement of freight, but are intended to confine tracing to cases where shipments have not reached destination after sufficient time for the movement has elapsed.

A code of rules governing the application, inspection, recording and care of car seals, prepared by the Association of Transportation and Car Accounting Officers and approved, by the Freight Claim Association, was submitted by the committee with the recommendation that it be adopted.

With the report was included the reports of the Committees on Weighing and on the Packing, Marking and Handling of Freight. The Committee on Weighing reported that no necessity is shown for the immediate amendment of the National Code of Weighing Rules, but attention is again called to the pressure which is being made upon railways to weigh cars light, and believes that this can be overcome by a more strict adherence to the car service rule relative to stenciled tare weights. The committee is advised that the enforcement of car service rule 20 has had a good effect upon the proper weighing of carload freight, and in many cases has increased the revenue of the railways.

The Committee on Jacking, Marketing and Handling of Freight submitted a report, of which the following is an abstract: A very considerable number of roads have continued to report the amounts paid for loss and damage to freight. This enables the committee to submit the following comparison of figures for the calendar years 1914 and 1915. It will be noted that this shows a reduction in payments of over \$7,500,000, nearly 24 per cent.

AMOUNTS PAID FOR LOSS AND DAMAGE TO FREIGHT DURING 1914 AND 1915

Period	Number roads reporting	Amounts Paid		Decrease	Per cent
		1914	1915		
6 months	99	\$16,879,124	\$13,366,088	\$3,513,036	20.8
9 months	100	21,522,731	17,350,061	4,172,670	19.4
12 months	112	31,916,543	24,290,024	7,626,519	23.9

The operating revenues of the railways made a slight increase in the calendar year 1915, which makes this decrease in loss and damage all the more gratifying.

A number of larger roads have given figures for 1914, and Exhibit B-1 shows a comparison of the total figures of these roads by commodities. This indicates where improvement has been made. The committee believes that further improvement can be made, and again calls attention to the necessity of strict observance by each individual road of the classification, loading and l. c. l. rules. There has been marked improvement in the enforcement of these rules.

Despite the general decrease it will be noted that very little improvement is apparent in the payments for loss and damage for eggs, grain and perishable freight.

The committee is assured that the increase in payments on account of eggs is only apparent, inasmuch as a large number of egg claims were held over from 1914 and 1915 by

various trunk lines on account of the investigation of the egg situation near New York.

The committee believes that marked improvement in the matter of loss and damage to grain will be effected if the association's rules for the inspection and certification of box cars before loading are more fully adopted.

The question of loss and damage to perishable freight is being actively investigated by two committees, one of which represents the carriers of the east and another the carriers of the middle west. These committees are acting in co-operation with the American Railway Perishable Freight Association and with the Committee on Packing, Marking and Handling of Freight.

Commodity—	1914		1915		Decrease
	Amount	Per cent	Amount	Per cent	
Boots and shoes.....	\$279,979	2.57	\$198,012	2.27	\$81,967 29.28
Clothing, dry goods and notions	705,084	6.46	491,192	5.64	213,892 30.33
Butter and cheese....	101,612	.93	78,707	.90	22,905 22.54
Eggs	167,607	1.54	213,816	2.45	*46,209 *27.57
Fresh fruits and vegetables	917,162	8.40	908,763	10.42	8,399 .92
Live stock	265,536	5.73	498,873	5.72	126,663 20.25
Meats and packing house products	308,546	2.83	240,181	2.76	68,365 22.16
Poultry, game and fish	66,811	.61	57,456	.65	9,355 14.00
Grain	867,333	7.95	876,157	10.05	*8,824 *1.02
Flour and mill products	477,204	4.37	454,877	5.22	22,327 4.68
Sugar	136,743	1.25	134,138	1.54	2,605 1.91
Groceries	426,726	3.91	293,339	3.37	133,387 31.26
Wines, liquors and beers	236,399	2.17	157,410	1.81	78,989 33.41
Tobacco and tobacco products	208,302	1.91	141,594	1.62	66,708 32.02
Cotton	128,921	1.18	60,732	.70	68,189 52.89
Furniture	661,976	6.07	481,905	5.53	180,071 27.20
Household goods	346,863	3.18	267,430	3.07	79,433 22.90
Products of cement, clay and stone.....	297,183	2.72	215,914	2.48	81,269 27.35
Glass and glassware	247,960	2.27	201,692	2.31	46,268 18.66
Stoves	183,647	1.68	127,964	1.47	55,683 30.32
Vehicles	111,824	1.02	101,423	1.16	10,401 9.30
Agricultural implem'ts	71,592	.66	46,993	.54	24,599 34.65
All other commodities	3,337,789	30.59	2,465,132	28.32	872,657 26.14
Total	\$10,912,799	100.00	\$8,713,700	100.00	\$2,199,099 20.15

*Increase.

In accordance with the resolution adopted by the association on May 19, 1915, all departments and all associations have been requested to co-operate in the formulation, improvement and enforcement of rules to prevent the loss and damage to freight. The committee has continued negotiations with the Association of American Railway Accounting Officers for the extension of through interline billing, and considerable progress has been made in this direction.

Attention is again called to the code of l. c. l. rules adopted by the association. These have been put into effect on a number of railways, and should be more generally adopted.

The committee believes that the best results have been and can be obtained in the lessening of payments for loss and damage by interesting the railway employees in the matter.

Various methods are being employed by various railways in this direction. All of them are good, and while some are better than others the same methods are not suited to all railroads. It may, however, be said that all the successful plans are based on the idea of giving the employees directly interested information as to the amounts which are paid for loss and damage from month to month, so that they can be kept fully aware of the results of their efforts.

The committee, therefore, recommends that all railroads compile statements of their loss and damage figures monthly, divided as heretofore prescribed by the Interstate Commerce Commission, with such further division by causes and commodities as are necessary to suit their own conditions, and that these statements be communicated monthly to those of their employees who are chiefly responsible for loss and damage, and especially to freight agents. Where practicable these figures should be distributed by operating divisions.

The committee also recommends that the railways bring such employees together, and especially their agents, so that they may profit from each other's experience and views.

General News Department

The national convention of the Brotherhood of Railroad Trainmen was opened at Detroit, Mich., on May 15.

The Brotherhood of Railroad Station Employees held its annual convention at Springfield, Mass., May 11, and re-elected P. J. Doyle, of Boston, president. The secretary is Frank Hughes, Medford, Mass.

Elisha Lee, assistant general manager of the Pennsylvania Railroad, has been elected chairman of the National Conference Committee of Railroad Managers appointed to negotiate with representatives of the train service brotherhoods on the wage demands.

The Missouri Pacific, after negotiations with the Order of Railway Telegraphers, has increased the wages of its station agents and telegraph operators by about six per cent, affecting about 1,300 men. The agreement also provides for a reduction in hours, a 15-day vacation with pay and an increase in overtime rates.

A press despatch from Eagle Pass, Tex., May 15 reports the derailment of a through passenger train from Mexico City as having occurred on May 12 near Queretaro, in which 24 persons were killed. The wreck appears to have been caused by robbers who carried away all the valuables they could get hold of.

During a discussion in the House of Commons of the Canadian parliament recently, the acting minister of railways stated that the expenditure on the Quebec bridge to date amounts to \$18,257,621, of which \$10,473,346 has been on the new bridge. The total cost of the structure, including the amount expended for the old bridge, is estimated at \$27,000,000.

The "Old Guard" of the Nashville, Chattanooga & St. Louis, an association of the few employees and officers of the road who have been in the service since the civil war, held its ninth annual meeting in Nashville recently, and decided to enlarge the membership by admitting anyone who has been in the service of the road 35 years. Major W. L. Danley, who entered railway service in 1857, continues to flourish as general passenger agent of the road, an office which he has held 47 years.

E. G. Baker, driving an eight-cylinder Cadillac automobile, arrived in New York City on May 15 in 7 days, 11 hours, 52 minutes from Los Angeles, Cal., 3,471 miles. This time was about 3 days, 19 hours better than the best preceding trip of the kind, which was made by Baker himself last year. Baker had made five trips across the continent before, two of them on motorcycles. On this run he traveled on each of several days more than 550 miles, and on one day he ran 567 miles. He slept about 19 hours on the trip. His route was by way of Flagstaff, Ariz.; Albuquerque, N. M.; Trinidad, Col.; Dodge City and Emporia, Kan.; Kansas City, Mo.; St. Louis, Mo.; Indianapolis, Ind.; Columbus, O.; Wheeling, W. Va.; Pittsburgh, Pa.; Philadelphia, Pa., and Trenton, N. J.

The railroads have appointed a conference committee to meet representatives of the Switchmen's Union of North America concerning the demands of that organization presented to a large number of roads early in March for an eight-hour day, an increase in wages and time and one-half for overtime. The railroad committee is composed of J. L. Nichols, superintendent, Baltimore & Ohio Chicago Terminal; C. B. Pratt, superintendent, Chicago, Rock Island & Pacific; J. A. Gordon, general manager, Chicago Great Western; Horace Baker, general manager, Cincinnati, New Orleans & Texas Pacific; E. M. Rine, general superintendent, Delaware, Lackawanna & Western; F. H. Wilson, general superintendent, New York Central; F. Hartenstein, assistant to general manager, Lehigh Valley. The committee will meet in New York on May 19 to organize.

The Department of Agriculture, Washington, D. C., wants a railroad man; and the United States Civil Service Commission announces an examination for the position—"assistant in transportation"—on June 13. The salary will be from \$1,800 to \$2,400. Applicants must be between 25 and 45 years old. The

duties of the position will be to assist in rendering practical service to producers and distributors of farm commodities, especially perishable commodities, in every phase of the transportation problem. The Civil Service Commission will look for men having practical experience in the freight traffic department of a common carrier involving responsibility not less extensive than that of division freight agent; or practical experience in the operating department involving responsibility not less extensive than that of chief despatcher or trainmaster; part of which experience should have been had within the past five years. Traffic managers of commercial organizations without railroad experience and those the greater part of whose experience and duties for three years immediately preceding the examination have been in connection with commodities other than farm products, will not be eligible.

Land Valuation

Thomas W. Hulme, general secretary of the Presidents' Conference Committee for the Federal Valuation of the Railroads, has issued a circular prepared by the Land Committee elaborating the suggestions made to the carriers in a previous circular dated November 30, 1915, with reference to co-operation between the railways and the government in securing land data. The government appraisers are now dividing the right of way into "zones" containing stretches of like character and value, without conference with the carrier, but after the value of similar lands in the vicinity has been investigated by the government appraisers, the zoning will be submitted to the carriers and an effort made to agree upon it. The government field men are working independently of the carriers to ascertain the value of the land for general purposes, and are reporting their findings to the land attorney in charge of that district, who is expected to confer with representatives of the road and listen to their arguments regarding the prices which should be applied. It is understood that up to the present time much of the government work on land valuation may be considered experimental, and that the commission has not approved any method of procedure, nor has the Division of Valuation reached any final conclusion. This circular outlines the manner in which the carriers may prepare for the land valuation and co-operate with the government forces in the ascertainment of value, while at the same time protecting their interests.

Strikes

G. W. W. Hanger, federal conciliator, reports that he is still engaged in mediation between the officers of the New York Central and the representatives of the telegraphers of that road, who have threatened to strike. The newspapers have printed reports, apparently not well founded, to the effect that mediation has failed and that the telegraphers would strike. On the New York, New Haven & Hartford, the president of the clerks' organization, issued an order May 16, calling on the clerks to strike on May 17 at 2 p. m.; but on the next day it was reported that R. B. Mahany, a representative of the Federal Board of Conciliation, had brought about a compromise and that the clerks would continue at work. The road had written letters to the individual clerks offering certain increases, said to amount to an average addition of 6.4 per cent to the payrolls. The clerks at first rejected the road's offer, but later said that they would forego certain advantages rather than precipitate a commercial and industrial struggle which would interfere with business prosperity in New England. The estimate of 6.4 per cent increase in payrolls is based on an advance of 20 cents a day to clerks receiving \$2 a day or less; 6 per cent, with a minimum of 15 cents, to men getting above \$2 and up to \$2.50; and 5 per cent, with a minimum of 15 cents, to those getting \$2.50 a day or more.

Numerous small strikes have been reported during the past week. Track repairmen on the Boston & Maine struck on May 16, and the number reported as going out is given as 1,400.

There was a strike of freight handlers of the New York Central at Rochester, N. Y. At Youngstown, Ohio, yard clerks of the Erie struck for an advance of \$10 a month. The striking trackmen on the Delaware & Hudson were reported on May 13 as having gone back to work.

An officer of the Boston & Maine says: "The trackmen's strike is largely a row between two labor organizations, and the railroad is the goat. For several years the road has had schedules with its track foremen and track laborers covering rates of pay and working conditions. Such a schedule was renewed with the regular trackmen's committee within the past six weeks. The men represented by this committee have not struck. A comparatively small proportion of the normal summer force have struck. They have been told that the two organizations had combined. It is expected that many of the men who left through this misunderstanding will return to service as soon as they know the facts. In the meantime the track will be maintained as usual."

Trackmen of the Cleveland, Cincinnati, Chicago & St. Louis struck at a number of places near Cincinnati on May 12.

The Pennsylvania Railroad has made advances in the pay of telegraphers throughout its lines. There has been no general movement and the increases are individual, based on conferences with the men personally, and are graduated according to merit and length of service.

The Southern Pacific announced on May 17 that an embargo had been placed on all shipments of freight from its railroad lines to be sent by vessel from Galveston or New Orleans to New York City, on account of the strike of longshoremen at New York; and shipments now detained will be sent to New York by rail. The New York laborers, to the number of 1,350, struck on May 9, and the railroad company, in its announcement, says that these men do not wish to leave their work, but have been intimidated by Paul Kelly, a well-known agitator.

The Southern Pacific has in service, between Gulf ports and New York, 23 ships. It can move 600 cars of freight a week eastward from Galveston, and as soon as new men can be secured for the New York docks the freight accumulated at Galveston can be moved. About 600 carloads is the amount now waiting there, and six ships are waiting at New York to be unloaded.

The M. C. B. and M. M. Conventions

The chairman of the entertainment committee of the Railway Supply Manufacturers' Association, Gilbert E. Ryder, of the Locomotive Superheater Company, New York, announces that it is hoped this year to re-establish the march from the headquarters hotel to the convention hall for the opening session.

All members and guests of the Master Car Builders' and Railway Supply Manufacturers' associations will assemble on the porch of the Marlborough hotel, and march to the convention hall for the opening session. The march will be headed by the officers of the Master Car Builders' Association, and suitable music will be provided.

Annual Convention of the American Society of Civil Engineers

The forty-eighth annual convention of the American Society of Civil Engineers will be held at the William Penn Hotel, Pittsburgh, on June 27 to 30, 1916. In addition to the business sessions of the convention inspection trips will be made to a number of the engineering industries in the vicinity of Pittsburgh. The annual business meeting of the society will be held at two o'clock Tuesday, June 27.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, date of next or regular meetings, and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, 455 Grand Central Station, Chicago. Next meeting, June 26, 1916, Boston, Mass.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, East St. Louis, Ill. Next meeting, June 20-23, 1916, Cincinnati, O.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPEFITTERS' ASSOCIATION.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago. Next convention, May 22-24, 1916, Hotel Sherman, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Building, Chicago. Annual meeting, June 19, 1916, Atlantic City, N. J.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Annual meeting June 27 to 30, Hotel Traymore, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesdays in month, except July and August, 220 W. 57th St., New York.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, Rooms 1116-8, Woodward Bldg., Washington, D. C. Annual meeting, June 28, 1916, Hotel Statler, Detroit, Mich.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Semi-annual meeting with Master Car Builders' Association. Annual convention, October, 1916, Chicago.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreuccetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Semi-annual meeting, June 16, 1916, Hotel Denis, Atlantic City, N. J.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 20-22, 1916, St. Paul, Minn.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, June 27-28, Boston, Mass.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

CINCINNATI RAILWAY CLUB.—H. Boutet, Chief Interchange Inspector, Cin'ti Rys., 101 Carew Bldg., Cincinnati. Regular meetings, 2d Tuesday, February, May, September and November, Hotel Sinton, Cincinnati.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May 23-26, 1916, Hollenden Hotel, Cleveland, Ohio.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 14, 1916, Atlantic City, N. J.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meeting, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Semi-annual meeting, May 24-25, 1916, Hotel Astor, New York.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders' and Master Mechanics' Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEWARK.—Roy S. Bushy, Firemen's Bldg., Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, 559 Broad St., Newark.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Gen'l Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings, bi-monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings, October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 20, 1916, Toronto, Ont.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's Office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Grand Pacific Hotel, Chicago.

WESTERN SOCIETY OF ENGINEERS.—E. N. Layfield, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

Traffic News

In the United States District Court at Philadelphia, May 12, the bill of the Lehigh Valley Railroad to restrain the Interstate Commerce Commission from enforcing its order calling upon the railroad to divest itself of its ownership in steamship lines on the Great Lakes, was dismissed.

The Tri-State Passenger Association, composed of passenger representatives of railroads in Indiana, Illinois and Missouri, who held a meeting at Springfield, Ill., last week, elected officers as follows: President, R. C. Gentry, traveling passenger agent, St. Louis & San Francisco, St. Louis, Mo.; vice-president, W. S. Weber, traveling passenger and immigration agent, Great Northern, Chicago; secretary, H. A. Crow, general agent, passenger department, Chicago & Alton, St. Louis.

The out-bound freight house yards and team tracks of all roads in Chicago are now closed for the receipt of freight at 5 p. m. excepting Saturdays. On Saturdays, during all months of the year, except July and August, out-bound freight house yards and team tracks will be closed at 4 p. m., and during July and August at 3 p. m. In-bound freight warehouses and team tracks will remain open for the delivery of freight until 5:30 p. m., except on Saturdays, when the closing hour will be 5 o'clock during all months of the year, except July and August, when it will be 3 o'clock.

The freight embargoes placed by the New York, New Haven & Hartford have been extended somewhat during the past week and the road has filed a tariff which apparently has received the approval of the Interstate Commerce Commission, providing for a charge of \$5 per day per car on delayed cars after the fifth day. The railroads centering in Boston have announced a similar increase in demurrage. At Baltimore, May 10, the Baltimore & Ohio announced a new embargo on grain destined to the elevators at Locust Point; but on the 15th this embargo was somewhat modified. The Southern Pacific has announced an embargo at Galveston on eastbound freight by water, because of a strike of longshoremen at New York City.

Freight Car Surpluses and Shortages

The American Railway Association committee on relations between railroads has issued its Statistical Statement No. 16, giving a summary of freight car surpluses and shortages for May 1, 1916, with comparisons, as follows:

TOTAL SURPLUS		
May 1, 1916.....	59,657	
April 1, 1916.....	52,274	
May 1, 1915.....	292,269	

The surplus for April 1, 1916, includes figures reported since the issue of Statistical Statement No. 15.

The total surplus increase over April 1 is largely box cars, in the West and Northwest. The Southeast, which has reported a considerable surplus of box cars for several months, shows a reduction of surplus cars of this class of equipment:

TOTAL SHORTAGE		
May 1, 1916.....	29,050	
April 1, 1916.....	47,636	
May 1, 1915.....	966	

The shortage for May 1, 1916, includes figures reported since the issue of Statistical Statement No. 15.

There is a general reduction in shortage over April 1 of all classes of equipment, except in the Southeast, which shows a small increase.

The figures by classes of cars follow:

Classes—	Surplus	Shortage
Box	18,241	20,508
Flat	3,966	1,286
Coal and gondola.....	17,814	5,139
Miscellaneous	19,636	2,117
Total	59,657	29,050

NEW FRENCH RAILWAY IN TUNIS.—The French resident-general in Tunis, April 18, formally inaugurated the new 50 miles of railway line to Gabes.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

To relieve freight congestion at North Atlantic ports the commission has issued an order establishing through rates from the chief cities in the Middle West on all commodities to Charleston, S. C., for export. The order provides that the rates to Charleston shall be the same as those now in effect from the same points to Norfolk, Va. The change affects shipments from Cincinnati, Louisville, New Albany, and Evansville, Ind., East St. Louis, St. Louis and Memphis, when shipments are routed over the Southern Railway.

Rates on Cotton Seed

Capital City Oil Company et al. v. Yazoo & Mississippi Valley. Opinion by Commissioner Daniels:

Carload rates on cotton seed from points on the Illinois Central and Yazoo & Mississippi Valley in the state of Mississippi to Baton Rouge and New Orleans, La., are not found unreasonable nor discriminatory. Complaint dismissed. (39 I. C. C., 141.)

Relation Between Rail and Water Carriers

Senate resolution No. 394 of May 16, 1914, in re relations between carriers by rail and carriers by water. Report to the Senate of the United States. By the commission:

By the resolution noted above the commission was requested

TABLE I*

Names of railroad systems	Steam vessels		Barges		Total of vessels	
	No.	Gross tonnage	No.	Gross tonnage	No.	Gross tonnage
Atlantic Coast Line Co.	6	13,373	...	...	6	13,373
Bessemer & Lake Erie R. R. Co.						
Buffalo, Rochester & Pittsburgh Ry. Co.	1	5,146	...	...	1	5,146
Chesapeake & Ohio Ry. Co.						
Delaware, Lackawanna & Western R. R.	3	2,336	18	14,999	21	17,335
Erie & Michigan Ry. & Navigation Co.	1	523	...	...	1	523
Erie R. R. Co.	8	20,343	15	10,265	23	30,608
Florida East Coast Ry. Co.						
Great Northern Ry. Co.	3	29,206	...	...	3	29,206
Illinois Central R. R. Co.	9	43,484	...	...	9	43,484
Lehigh Valley R. R. Co.	12	21,233	49	28,234	61	49,467
Maine Central Ry. Co.	7	3,080	...	...	7	3,080
New York Central & Hudson River R. R. Co.	30	87,159	2	1,562	32	88,721
New York, New Haven & Hartford R. R. Co.	74	134,784	47	26,792	121	161,576
Norfolk & Western Ry. Co.	3	139	6	962	9	1,101
Norfolk Southern R. R. Co.	3	1,640	...	...	3	1,640
Northern Pacific Ry. Co.	16	44,436	3	2,728	19	47,164
Pacific Coast Steamship Co.	69	73,194	33	21,928	102	95,122
Pere Marquette R. R. Co.	2	4,315	...	...	2	4,315
Reading Co.	15	8,171	87	80,736	102	88,907
Seaboard Air Line Ry.	20	35,583	...	...	20	35,583
Southern Pacific Co.	70	245,756	24	14,239	94	259,995
Southern Ry. Co.	8	15,428	...	...	8	15,428
Union Pacific R. R. Co.	10	16,205	...	...	10	16,205
Canadian Pacific Ry. Co.	7	19,990	...	...	7	19,990
Grand Trunk Ry. Co. of Canada.	11	30,006	...	...	11	30,006
Total	388	855,530	284	202,445	672	1,057,975

*The table as given in the report also has 19 footnotes, omitted here because of lack of space, giving cases of joint ownership.—ED.

to ascertain, by requiring special reports of rail lines, coastwise vessel lines, and of such other lines as in the judgment of the commission seemed advisable:

First. (a) To what extent vessels and steamship lines are engaged in transporting freight between Atlantic and Pacific ports and in the coastwise trade of the United States, wholly by water, or partly by water and partly by rail, under the joint ownership, common control, community of interest or otherwise, with railroad companies; and

(b) What vessels or steamship lines are so owned and controlled, and the names of the owners, stockholders, trustees, holding companies, directors and officers of all steamship lines and railroad companies engaged in the coastwise and foreign trade of the United States; and to what extent they are consolidated, directed, or operated by and through holding companies, interlocking stock, interlocking directorates, or interlocking officers.

Second. (a) The prevailing rates upon the principal commodities carried

between Atlantic and Pacific ports of the United States wholly by water or partly by water and partly by rail across the Isthmus of Panama or Tehuantepec, and the prevailing rates between the same points wholly by rail; and

(b) The prevailing rates upon similar commodities transported under like conditions wholly by water by vessels not under United States registry for distances similar to the distance between the Atlantic and Pacific ports of the United States.

Third. The prevailing rates upon the principal commodities carried by vessels in the coastwise trade of the United States as compared with the rates on similar commodities for similar distances carried by vessels in the foreign trade of the United States; and

Fourth. The prevailing rates upon similar commodities transported wholly by water by vessels not under United States registry for similar distances under similar conditions as compared with the rates in the coastwise trade of the United States.

This report is based on returns made by 337 carriers, of which 170 are railroads and 167 carriers by water. These railroads represent substantially all the railway mileage operated under corporate or other relationship with water carriers. The report deals with conditions as of June 30, 1914. The data submitted shows that 27 railroad systems were engaged or were interested in the transportation of freight by water either directly or indirectly through subsidiary rail line or water line carriers, and these 27 systems owned, controlled or leased 388 steam vessels, 284 barges, with a total tonnage of 1,057,975, as shown in Table I.

The 27 railroad systems named in Table I, with their subsidiaries shown in Exhibit 1 in the report, which were engaged in transportation by water or which had corporate interest in carriers so engaged comprised 106 separate companies; of these 46 were not engaged in the transportation of the traffic involved in the resolution; the ownership of the vessels that were operated in such traffic was vested in the other 60 carriers, of which 19 were carriers by rail and 41 carriers by water:

TABLE II—OWNING COMPANIES

Class—	Steam vessels		Barges		Total of vessels		
	No.	Gross tonnage	No.	Gross tonnage	No.	Gross tonnage	
Rail carriers	19	147	238,816	124	112,395	271	351,211
Water carriers	41	237	610,888	160	90,050	397	700,938
Total	60	*384	849,704	284	202,445	*668	1,052,149

*Does not include four steam vessels, gross tonnage 5,826 tons, chartered from owners not shown in Exhibit I.

TABLE IV—GEOGRAPHICAL DISTRIBUTION

Waters traversed—	Steam vessels		Barges		Total of vessels	
	No.	Gross tonnage	No.	Gross tonnage	No.	Gross tonnage
Atlantic and Gulf coasts.....	231	406,126	267	190,099	498	596,225
Pacific coast	71	224,870	10	9,629	71	234,499
Great lakes	67	197,928	2	1,562	69	199,490
Total	369	828,924	279	201,290	648	1,030,214

TABLE V—TERRITORIAL DISTRIBUTION

Routes traversed—	Steam vessels		Total of vessels	
	No.	Gross tonnage	No.	Gross tonnage
Atlantic and Gulf coasts:				
To Canadian ports	3	10,174		
To Cuban ports	6	11,349		
To European ports	2	8,270		
Pacific coast:				
To Canadian ports	4	11,947		
To Mexican ports*	9	25,972		
To oriental ports	8	85,861		
Great lakes: To Canadian ports.....	6	19,108		
Total	38	172,681		

*Also to Balboa, Panama.

TABLE VI—SUMMARY OF ALL VESSELS ENGAGED IN THE COASTWISE AND FOREIGN TRADE OF THE UNITED STATES IN WHICH RAILROADS ARE INTERESTED DIRECTLY OR INDIRECTLY

In community of interest with railroads through—	Steam vessels		Sailing vessels and barges		Total of vessels	
	No.	Gross tonnage	No.	Gross tonnage	No.	Gross tonnage
Intercompany relationship..	388	855,530	284	202,445	672	1,057,975
Interlocking stocks, directorates, or officers	382	1,859,796	44	24,170	426	1,883,966
Total	770	2,715,326	328	226,615	*1,098	2,941,941

*Includes vessels owned but not operated on June 30, 1914.

The commission's report contains four exhibits giving further details. Each exhibit is accompanied by an explan-

atory note. Exhibits 1, 2 and 3 contain particulars as to the relations, corporate or otherwise, between railroads and water lines, as requested in the first paragraph of the resolution. From these three exhibits it appears that 121 railroads were interested in 86 carriers by water through intercorporate relationship, interlocking stocks, directorates or officers. Of the railroads, the interest of 69 was through interlocking stocks, directorates and officers only, and of 52 railroads through intercorporate relationship. Of the latter, 50 railroads were also among those whose interest in water carriers was through interlocking stocks, directorates or officers. Of the 86 carriers by water 40 had no corporate relationship with any railroad. Railroads were interested in these water carriers through interlocking stocks, directorates or officers only. These 40 companies owned and operated 426 vessels, which have a combined gross tonnage of 1,883,966 tons.

Exhibit 4 is subdivided into sections A and B, and contains particulars as to the prevailing rates between the Atlantic and Pacific ports of the United States and the rates in the coastwise and foreign trade, as requested in the second, third and fourth paragraphs of the resolution. (39 I. C. C., 1.)

STATE COMMISSIONS

"The Southeastern Association of Railroad Commissioners" is the name of an organization formed at a conference in Atlanta, Ga., last week by the commissioners of Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee and Kentucky. The president of the association is C. M. Candler, of Georgia; vice-president, J. G. Richards, of South Carolina; secretary, J. G. Webster, rate clerk of the Georgia commission. The main object of the association will be to take such action as is practicable to secure uniformity, among adjoining states, in regulations for the classification of freight, and other matters connected with freight transportation.

PERSONNEL OF COMMISSIONS

Philip D. Laird, of Montgomery county, has been appointed a member of the Maryland Public Service Commission, succeeding W. L. Henry, whose term has expired. Mr. Laird was formerly chairman of the commission, but resigned about a year ago because of ill health. He has now recovered. The new commissioner was speaker of the House of Delegates in the last Maryland legislature. The appointment becomes effective June 1.

UNITED STATES SUPREME COURT

Stipulations for Notice of Claims Valid in Cases of Misdelivery

The Supreme Court of the United States holds, affirming a decision of the Court of Appeals of Georgia (15 Ga. App., 142), that a provision in an interstate bill of lading requiring reasonable notice of claims "in cases of failure to make delivery" includes all cases of such failure, as well those due to misdelivery as those due to the loss of the goods. The provision is to be construed in the same way with respect to the connecting or terminal carrier as in the case of the initial carrier.

The question arose in an action in trover by a milling company against the terminal carrier for the conversion of flour billed to the shipper's order and delivered by the carrier to another without production of the bill of lading. The court holds that the applicability of the stipulation for notice was not affected by the form of the action; its scope was nothing more than that of an action for damages against the delivering carrier. It was urged that the carrier, in making the misdelivery, converted the flour and thus abandoned the contract. But the court held that the parties could not waive the terms of the contract under which the shipment was made pursuant to the federal act; nor could the carrier by its conduct give the shipper the right to ignore these terms, which were applicable to that conduct, and hold the carrier to a different responsibility from that fixed by the agreement made under the published tariffs and regulations. While holding the stipulation valid and applicable, the court held that it had been complied with by a telegram from the shipper to the carrier containing an

adequate statement of the claim, such a telegram meeting the requirement for "notice in writing."—Georgia, Florida & Alabama v. Blish Milling Co. Decided May 8, 1915.

COURT NEWS

The Elgin, Joliet & Eastern was convicted in the United States District court at Chicago on May 15 for violations of the interstate commerce law on 16 counts. The company was charged with carrying fiber boxes for the Carrier-Lowe Company of Joliet at the rate applicable to the raw material.

Cause of Fires—Burden of Proof on Plaintiff

The Michigan Supreme Court holds that the state statute making a railroad liable for "all loss or damage to property by fire originating from such railroad" simply shifts the burden of proof to the railroad to show that the fire was not negligently set. It does not change the common-law liability for setting fires; and it does not relieve the plaintiff of the burden of establishing the origin of the fire.—Beach v. M. C. (Mich.), 157 N. W., 285.

Crossing Accident—Contributory Negligence

The Pennsylvania Supreme Court holds that a pedestrian, who, after waiting 10 minutes at a crossing obstructed by a train, when it was so dark that he could see only three cars, attempted to climb over the cars at the invitation of a person walking on top, was guilty of contributory negligence barring recovery for injuries from the starting of the train.—Charlton v. Baltimore & Ohio (Pa.), 97 Atl., 126.

Applicability of State Employers' Liability Act

The Indiana Appellate Court holds that the Indiana employers' liability act, which, it is well settled, is designed exclusively for the benefit of those who are, in the course of their employment, exposed to the particular dangers incident to the use and operation of railroad engines and trains, and whose injuries are caused thereby, does not apply to a railroad employee injured by the falling of the door of a standing dump coal car, which was being unloaded at a dock on which, in the course of his employment, he was breaking coal.—Toledo, St. Louis & Western v. Cowan (Ind.), 112 N. E., 23.

"Intoxicating Liquors"—Malt Medicine

In an action against a railroad for refusal to deliver to a consignee a shipment of Pabst Malt by reason of the South Carolina statute prohibiting the delivery of beverages containing more than 1 per cent of alcohol, it appeared that the malt was a medicine, that it contained no more than 5 per cent. of alcohol, and that it would not intoxicate anyone by immoderate use, because one using it "would become sick long before he became intoxicated." The South Carolina Supreme Court held that the liquor was not within the statute.—Geer Drug Co. v. Atlantic Coast Line (S. C.) 88 S. E. 448.

Excessive Damages

A railroad by request stopped a limited train at a non-stop station to take on a number of passengers. By direction of the conductor they rode a distance of eight miles in a baggage car after passing through a compartment devoted to negroes. One of them sued the railroad for damages for the discomfort she experienced, alleging that the passenger coaches were not filled. Assuming this to be true, the Mississippi Supreme Court held that, as the plaintiff had failed to protest against riding in the baggage car, the minor discomforts did not support an award of \$100 actual and punitive damages. Judgment for the plaintiff was reversed and the action dismissed.—Illinois Central v. Shackleford (Miss.), 71 So., 298.

Carrying Beyond Station—Excessive Damages

A passenger, who was *enceinte*, was negligently carried beyond her station. The delay in returning by another train was about an hour and three-quarters, but it appeared that she was courteously treated and required to pay no further fare. The Arkansas Supreme Court holds that an award of \$50 damages was excessive, and \$10 was ample compensation for any mental

suffering she may have undergone by reason of the facts that she had no money to pay additional fare, and that she worried about her child at home.—Louisiana & Arkansas v. Mason (Ark.), 183 S. W., 977.

Connections with Other Roads—Power of Public Service Commission

Under the New York Public Service Commissions law, section 27, giving the Public Service Commission power, upon application of a shipper, to order the installation of a connection with a lateral line of railroad or side track, the New York Appellate Division holds that it is beyond the power of the commission to order the building of an elevated side track to the shipper's plant, that being more than a physical connection, and extending beyond the property of the railroad; nor can the act of the commission in ordering the building of such a side track be sustained under section 4 of the law, providing that the commission shall have all powers necessary or proper to enable it to carry out the purposes of the chapter. The commission has no authority, under section 27, to require the railroad to obtain a permit from public authorities for the construction of a siding without the line of its property.—People ex. rel. Long Island v. Public Service Commission, 156 N. Y. Supp., 198.

Barge Demurrage

In an action to recover the value of lumber shipped over the New York Central from White Plains, N. Y., to Hoboken, N. J., and carried across the Hudson river from New York City, by barge, it appeared that the lumber arrived June 30, and that the consignee was notified on or about July 1, and told that if he did not take the lumber away there would be a demurrage charge. The New York Appellate Division holds that the railroad, on the consignee's failure to pay the barge demurrage, was not liable for its refusal to deliver. There was nothing in the bill of lading preventing the railroad from using a barge in carrying the lumber, and in ordinary course it had to be carried part way by water. It was therefore authorized to use a barge in transportation, and could demand demurrage at the boat rate of \$10 a day, instead of the car rate of \$1 a day.—Levenson Wrecking Co. v. New York Central, 156 N. Y. Supp., 656.

Fire Exemptions in Industrial Track Agreements

In an action against a railroad for the loss of warehouses destroyed by fire communicated by one of its locomotives, the South Carolina Supreme Court holds to be valid and not against public policy two warehouse and industrial track agreements, reciting the railroad's license to the plaintiff to erect and maintain two warehouses on the railroad right of way, and providing that the plaintiff should save the railroad harmless against all claims and demands against the latter from loss or injury from fire or otherwise, however resulting, by reason of the presence of the warehouses on the right of way, and that upon the construction and operation of a track and the affording of terminal facilities it would save the railroad harmless against all damage resulting from its negligence or from fire by the engines or trains in connection with the track. Judgment for the defendant was affirmed.—Batesburg Cotton Oil Co. v. Southern (S. C.), 88 S. E. 360.

Separation of Passengers—Reasonable Regulations

In an action for damages for compelling the plaintiff, a white man, to ride in the coach set apart for colored passengers, it appeared that the plaintiff, who was a sheriff, had in charge a colored prisoner. Officers transporting prisoners are excluded from the operation of the colored-car statute. It was held by the North Carolina Supreme Court that no actionable wrong had been done to the plaintiff. Where emergencies or exceptional conditions arise, not covered by any rule of the railroad, assuming that the road would have power to make general rules on the subject, the conductor must be allowed reasonable authority for the ordering of his train. While, of course, it is better to have established rules, it is impossible to frame such applicable in every possible case. The conductor, as the representative of the company on the ground, must, of necessity, be allowed to deal with such conditions; though it is a power always to be exercised with sound judgment.—Huff v. Norfolk Southern (N. C.), 88 S. E., 344.

Railway Officers

Executive, Financial, Legal and Accounting

C. R. Moore has been appointed assistant to vice-president of the Grand Trunk, with office at Montreal, Que.

G. Marks has been appointed assistant freight claim agent of the Texas & Pacific with office at Dallas, Tex.

D. B. Daley has been appointed freight claim agent of the Lehigh Valley, with office at Philadelphia, Pa., succeeding G. C. Arnold, deceased.

Grant D. Curtis, general manager of the western department of the Adams Express Company, has been appointed vice-president and general manager.

J. A. Middleton, vice-president of the Lehigh Valley at New York will assume charge of the valuation, real estate, tax, industrial and insurance departments and will perform such other duties as may be assigned to him by the president.

F. L. Blendinger, assistant to the vice-president of the Lehigh Valley, at New York, has been elected vice-president in charge of operation and maintenance, with headquarters at New York. Mr. Blendinger began his railroad career as a messenger for the Erie Railroad at Little Valley, N. Y., in 1878. While in this position he had an opportunity to learn how to handle a telegraph instrument, and in 1880 he was appointed a regular telegraph operator. During the next few years he served as agent and yardmaster and in the dispatcher's office. Later, he was extra agent, and spent a considerable time in the general offices of the road in Cleveland. In 1886, he was transferred to the general office of the Erie in New

York City and in 1898 he was promoted to the position of chief clerk to the second vice-president in charge of operation. Two years later, Mr. Blendinger became superintendent of telegraph of the Erie lines and of the seventh district of the Western Union Telegraph Company. In January, 1902, retired from railroad service, but six months later he came back and entered the service of the Lehigh Valley. A few years later he was made superintendent of telegraph and purchasing agent, and later became assistant to the vice-president, which position he held until his recent election as vice-president of the same road, with headquarters at New York, as above noted.

Operating

John T. Walsh has been appointed car accountant of the Lorain, Ashland & Southern, with headquarters at Lorain, Ohio.

P. T. Reilly, inspector of transportation of the Lehigh Valley at South Bethlehem, Pa., has been appointed general yard inspector of the system, with headquarters at South Bethlehem, Pa.

L. F. Newton, trainmaster of the Northern Pacific at Helena, Mont., has been appointed assistant to the general superintendent of the Western district with office at Tacoma, Wash.

Frank C. Hoff, chief accountant in the office of the general manager of the Pennsylvania Railroad, at Philadelphia, Pa., has been appointed assistant to the general manager, with office at Philadelphia.

F. C. Dow, trainmaster of the Chicago, Milwaukee & St. Paul at Three Forks, Mont., has been appointed trainmaster of the Missoula division. J. P. Phelan, chief despatcher at Missoula, Mont., has been appointed assistant trainmaster of the Missoula division, and G. H. Hill succeeds Mr. Phelan. All with offices at Missoula.

Gamble Latrobe, who has been appointed general superintendent of the Philadelphia, Baltimore & Washington, with headquarters at Wilmington, Del., as has already been announced in these columns, was born on January 21, 1866, at Baltimore, Md., and was educated in the private schools. He began railway work on April 4, 1884, as a rodman on construction of the Philadelphia division of the Baltimore & Ohio. In August, 1887, he became a levelman on the Pennsylvania Railroad, and in May of the following year entered the service of the Philadelphia & Reading at Williamsport, Pa. On October 2, 1889, he returned to the service of the Pennsylvania Railroad at Altoona, and was appointed assistant supervisor in February, 1890. From January, 1895, to April, 1902, he served as supervisor; then to March, 1908, as division engineer on the Baltimore division. From March 11 to October 15, 1908, he was acting general agent and superintendent at Baltimore, and since that time served as general agent of the Philadelphia, Baltimore & Washington, and the Northern Central Railway, and as superintendent of the Baltimore division of the Northern Central at Baltimore, Md.

R. C. Andrews, assistant general superintendent of the Texas & Pacific, has been appointed superintendent of the Ft. Worth division with headquarters at Ft. Worth, Tex. The position of assistant general superintendent has been abolished. E. Cordeal has been appointed assistant to the general superintendent, with office at Dallas, Tex.

E. D. Hungerford has been appointed assistant superintendent of the Chicago, Rock Island & Pacific, with jurisdiction extending over the Twin City terminals, headquarters at Minneapolis, Minn., vice P. A. Murphy, retired. C. W. Lafler has been appointed trainmaster at Omaha, with jurisdiction over the Omaha and Council Bluffs terminals, vice E. D. Hungerford, transferred. W. E. Warren has been appointed trainmaster with headquarters at Iowa Falls, Iowa, vice C. W. Lafler, transferred.

Allan Purvis, who has been appointed general superintendent of the Eastern division of the Canadian Pacific with headquarters at Montreal, Que., as has already been announced in these columns, was born on June 29, 1879, in the island of Java, and was educated at Tailor's College, Liverpool, England. He began railway work on August 4, 1890, as a messenger in the store's department of the Canadian Pacific at Vancouver, B. C. He subsequently served consecutively as storeman, clerk and invoice clerk at the same place, timekeeper at Donald, clerk and timekeeper at Vancouver, until October, 1894, when he was appointed storekeeper at North Bend. Two months later he was transferred in the same capacity to Kamloops, and in March, 1895, was appointed clerk in the fuel department at Vancouver. He was then consecutively fuel inspector, chief clerk in the car service and fuel departments, and chief clerk in the general dispatcher's office. In November, 1905, he was appointed assistant to general superintendent at Vancouver; in February, 1908, he was appointed superintendent at Souris, Man., and the following December was transferred as superintendent to Nelson, B. C. He resigned from the Canadian Pacific in October, 1909, to take charge of the operation and construction of interurban railways for the British Columbia Railway Com-



G. Latrobe



F. L. Blendinger

pany, and until May, 1910, served as local manager, and then as manager of the same road at New Westminster, B. C. In March, 1915, he returned to the service of the Canadian Pacific as superintendent at London, Ont., which position he held at the time of his recent appointment as general superintendent of the Eastern division, with headquarters at Montreal, of the same road, as above noted.

F. G. Minnick, whose appointment as superintendent of car service of the Pittsburgh & Lake Erie, with headquarters at Pittsburgh, Pa., has already been announced in these columns,

was born on September 19, 1873, at Kent, Ohio, and entered the service of the New York, Lake Erie & Western, now the Erie Railroad, on July 5, 1891, as a clerk in the office of the division superintendent at Kent. Leaving this position he served subsequently on the Erie Railroad consecutively as station baggage agent, ticket clerk, freight clerk and assistant cashier, also as transportation clerk in the transportation department of the same road at Cleveland, Ohio, until July, 1899, when he resigned to go into other business. He entered the

service of the Pittsburgh & Lake Erie as freight clerk at Rankin, Pa., on January 18, 1900; was appointed freight agent at New Castle junction the following October, and became assistant yard master at New Castle on January 1, 1902. He entered the office of the superintendent of transportation at Pittsburgh as clerk on April 14, 1904; three years later he was appointed chief clerk in the transportation department, and on May 15, 1912, was appointed car accountant, which position he held until his appointment on May 1, 1916, as superintendent of car service of the same road, as above noted.

Traffic

E. W. Vail has been appointed general agent of the Erie with office at Springfield, Ohio, vice F. M. Day, resigned.

J. B. Durham, whose appointment as assistant general passenger agent of the Oregon Short Line, with headquarters at Salt Lake City, Utah, vice D. S. Spencer, promoted, has already

been announced in these columns, was born at La Salle, Ill., in 1868. He began his railroad career in 1883 as a messenger in the general passenger department of the Union Pacific. He served in various capacities in that department until 1897, when he went to Salt Lake City as rate clerk in the general passenger department of the Oregon Short Line. About five years ago he was promoted to the position of chief clerk of the passenger department in charge of the rate and division bureau. He remained in that position until his recent



J. B. Durham.

promotion on May 1, as assistant general passenger agent of the same road.

E. H. Ehrenspurger has been appointed commercial agent of the Chicago, Indianapolis & Louisville, with office at La Fayette, Ind.

A. K. Short, has been appointed agricultural agent of the Ft. Worth & Denver City, with headquarters at Wichita Falls, Tex.

Walter J. Morris, statistician in the general passenger office of the Union Pacific at Omaha, Neb., has retired under the pension rules of the company.

C. R. Davidson, recently appointed assistant general passenger agent of the Chicago & Alton, with office at Chicago, was born on April 29, 1862, at Madison, Wis. He attended the public schools of Madison, and graduated from the University of Wisconsin in June, 1881. He first entered railway service as an employee of the Chicago & North Western in February, 1882. From December, 1882, to January, 1884, he was chief clerk in the ticket auditor's office of the Chicago, Burlington & Quincy at Omaha, Neb. From the latter date until 1897 he was employed successively as cashier, rate clerk and chief clerk in the general passenger office of the Burlington at Omaha. He was local secretary of the Western Pas-

senger Association at Minneapolis, Minn., from February, 1897, to February, 1898. He was secretary of the Western Passenger Association, with headquarters at Kansas City, Mo., from February, 1898, to January 1, 1900, when he first joined the service of the Chicago & Alton as chief rate clerk. From January 1, 1903, to January 1, 1909, he was chief clerk in the general passenger department of the Chicago & Alton. He was assistant general passenger agent until January 1, 1911, when he resigned and engaged in business with the American Loose Leaf Manufacturing Company. He re-entered the service of the Chicago & Alton as chief clerk to the passenger traffic manager on September 1, 1912.

C. W. Galligan, whose appointment as assistant freight traffic manager of the Chicago & Alton has been announced, was born at Cairo, Ill., in October, 1868. He was educated in the public

schools of Cairo, and after graduating from high school took a commercial course under a private tutor. He entered railway service in 1885, at the local freight office of the Cairo, Vincennes & Chicago, now the Cairo division of the Big Four, at Cairo. In 1888, he was transferred to the general freight office of the same road as rate clerk, and, in 1889, was promoted to the position of chief clerk in the same office. In 1890, when the Cairo and St. Louis divisions of the Big Four were consolidated, he was transferred to St. Louis as chief clerk to



C. W. Galligan

the assistant general freight agent in charge of both the Cairo and St. Louis divisions. In 1892, he was appointed contracting freight agent with office at St. Louis. He was appointed general freight agent of the St. Louis, Chicago & St. Paul on August 1, 1895, and in January, 1900, when this road was absorbed by the Chicago, Peoria & St. Louis, he was appointed assistant general freight agent with offices at St. Louis. On October 1, 1906, he was promoted to general freight agent

of that company with offices at the same city. He entered the service of the Chicago & Alton as general freight agent with office at Chicago, Ill., on September 15, 1912, and continued in that position until May 1, 1916, when he was promoted to assistant freight traffic manager.

F. E. Rownd, traveling freight agent of the St. Louis Southwestern at Kansas City, Mo., has been appointed commercial agent at that city, vice J. L. Marens, resigned on account of ill health.

Alexander Jackson, general European agent of the Chicago, Rock Island & Pacific, with headquarters at London, Eng., has been appointed general immigration agent, with headquarters at Chicago, Ill.

Frank Koch, assistant to the general traffic manager of the Texas & Pacific has been appointed assistant freight traffic manager with office at New Orleans, La. V. Schaffenbergs has been appointed assistant general freight agent at New Orleans.

I. M. Griffin, general freight agent of the Texas & Pacific at Dallas, Tex., has been promoted to assistant freight traffic manager. J. B. Payne, assistant general freight agent has been promoted to general freight agent and C. Schoenfelder has been appointed assistant general freight agent, all with headquarters at Dallas, Tex. Effective May 15.

Engineering and Rolling Stock

H. O. Kelley, assistant engineer of the Evansville & Indianapolis, has been appointed division engineer, with office at Terre Haute, Ind.

H. B. Welsh, supervisor of the Pennsylvania Railroad at York, Pa., has been appointed supervisor of division No. 29, with office at Reading, vice T. E. Lightfoot, transferred; F. C. Putney, supervisor at Freeport, succeeds Mr. Welsh; W. B. Carpenter, supervisor at Reynoldsville, has been appointed supervisor of division No. 32, with office at Earnest, vice W. S. Springer, transferred, and E. L. Hoopes has been appointed supervisor of division No. 23, with office at Osceola Mills, vice F. M. Robb, transferred.

J. M. Kerwin has been appointed master mechanic of the Dakota division of the Chicago, Rock Island & Pacific, with office at Estherville, Iowa, vice W. B. Embury, transferred. S. E. Mueller has been appointed general foreman locomotive department of the Cedar Rapids, (Iowa), shops, vice J. M. Kerwin, promoted. T. F. Phelan has been appointed road foreman of equipment, vice B. J. Bonner, transferred. R. A. Huey has been appointed general locomotive foreman at Armourdale, Kan., vice E. P. Eich, acting foreman.

Purchasing

R. O. Woods has been appointed division storekeeper of the Mobile & Ohio, with office at Meridian, Miss., vice M. R. Ducey, resigned to accept service with another company.

Samuel Wilson Saye, recently appointed purchasing agent of the Georgia & Florida, with headquarters at Augusta, Ga., was born on August 4, 1893, at Athens, Ga. He was educated in the grammar schools and later took a commercial course; then for two years received private instruction at Augusta. On January 8, 1912, he began railway work as a stenographer on the Southern Railway at Columbia, S. C. The following April he entered the service of the Georgia & Florida as a stenographer in the accounting department, and three months later he became secretary to the general manager. On February 1, 1916, he was appointed commercial agent, with headquarters at Vidalia, Ga., which position he held at the time of his recent appointment as purchasing agent at Augusta of the same road.

OBITUARY

C. C. Spalding, commercial agent of the Rock Island Lines at Cincinnati, Ohio, died on May 4.

A. J. Blaisdell, recently appointed general agent, passenger department of the Canadian Pacific ocean services, died on May 10, at Washington, D. C.

Richard Gentry, one of the early promoters of lines south of Kansas City now constituting the Kansas City Southern, died at his home in Kansas City, Mo., on May 8.

Henry Rohwer, one of the pioneer engineers of the West, died at St. Louis, Mo., on May 5, age 68 years. He was born in Germany and came to this country in 1869. He held various engineering positions with the Burlington & Missouri River, the Omaha & Southwestern, the Oregon Short Line and the Omaha Belt. From March 1, 1901 to January 1, 1905, he was chief engineer of the Missouri Pacific. Since that time he was engaged in private practice as consulting engineer.

Elmer L. Corthell

Dr. Elmer Lawrence Corthell, one of the most distinguished American civil engineers of the nineteenth century, died at a hospital in Albany, N. Y., May 16, after a long illness. His home was at North Egremont,

Mass. He was president, at the time of his death, both of the American Society of Civil Engineers and of the American Institute of Consulting Engineers. He lived at the Marie Antoinette Hotel, New York, in winter and had an office at No. 149 Broadway. His principal work the last few years was as a member of the Board of Consulting Engineers of the New York State Barge Canal. For a quarter of a century he had been a consulting engineer on important public works in both North and South America.

Dr. Corthell was born in South Abington, Mass., and was nearly 76 years old. He was educated at Brown University, but his term there was interrupted by the Civil War, in which he served for four years, rising to the command of a battery at the end of the war. He was graduated in 1867. He at once took up engineering work, and in 1868 was assistant engineer in charge of construction on the Hannibal & Naples Railroad in Illinois. Among the noted works of which he had charge were the Chicago & Alton bridge across the Mississippi at Louisiana, Mo., with a draw 444 ft. long, then the longest in the world; the jetties at the mouth of the Mississippi river, where he served under James B. Eads for four years; surveys (1880) for the proposed ship railway at the Isthmus of Tehuantepec; the New York, West Shore & Buffalo Railroad, including the Weehawken Terminal; the Merchants' bridge at St. Louis, and the Cape Cod Canal. For 11 years he was engineer of the Cape Cod Canal Company.

Mr. Corthell also had served as division engineer on the Hannibal & Central Missouri; chief assistant engineer in the building of the bridge at Hannibal; and in the construction of the independent entrance of the Illinois Central and the Atchison, Topeka & Santa Fe at Chicago. In partnership with George S. Morison (New York City) he built many large harbor works, bridges and viaducts, and was in charge of the construction of the Illinois Central bridge over the Ohio at Cairo, Ill. He had been on numerous governmental commissions and investigating boards, including two years' service for the Argentine government at Buenos Aires. He represented the Argentine government at the International Congress in Dusseldorf. He was a member of the American Railway Engineering Association, the American Society of Civil Engineers, the American Institute of Consulting Engineers, the Institution of Civil Engineers of Great Britain and many other scientific and patriotic societies. He was the author of numerous engineering works, and Brown University, in 1894, conferred on him the honorary degree of doctor of science.



E. L. Corthell

Equipment and Supplies

LOCOMOTIVES

THE PENNSYLVANIA RAILROAD, reported in last week's issue as being in the market for 75 Mikado locomotives for the Lines East of Pittsburgh, has ordered these locomotives from the Baldwin Locomotive Works.

THE ST. LOUIS SOUTHWESTERN was reported in the *Railway Age Gazette* of April 7 as having ordered 20 locomotives from the Baldwin Locomotive Works. This order included 12 Consolidation and 8 ten-wheel locomotives.

THE CANADIAN GOVERNMENT RAILWAYS, reported in the *Railway Age Gazette* of April 28 as being in the market for 25 Mikado locomotives for the Intercolonial Railway, has ordered 30 Mikado locomotives from the Canadian Locomotive Company.

THE TEMISKAMING & NORTHERN ONTARIO is reported to have ordered 6 Mikado locomotives from the Canadian Locomotive Company. These are in addition to 6 Mikado locomotives ordered from the American Locomotive Company, and reported February 25.

THE TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS was reported in last week's issue as having ordered 12 six-wheel switching locomotives from the American Locomotive Company. These locomotives will have 22½ by 30-in. cylinders, 51-in. driving wheels, a total weight in working order of 200,000 lb., and will be equipped with superheaters.

THE WEST INDIA MANAGEMENT & CONSULTATION COMPANY, 129 Front street, New York, has ordered one Mogul type locomotive from the American Locomotive Company for the Trinidad Sugar Company. This locomotive will have 12 by 18-in. cylinders, 34½-in. driving wheels, and a total weight in working order of 50,000 lb.

ROBERT W. HUNT & CO., Pittsburgh, Pa., invite tenders on 3 ten-wheel freight locomotives for the Hankow-Ichang section of the Hankow-Szechuan Railway, Chinese Government Railways. Conditions of contract, drawings, etc., can be obtained on payment of \$2.50 at the office of Robert W. Hunt & Co., Monongahela Bank building, Pittsburgh, Pa.

FREIGHT CARS

THE ITALIAN STATE RAILWAYS have ordered 2,000 gondola cars, and 1,000 box cars, from the American Car & Foundry Company.

THE CANADIAN GOVERNMENT RAILWAYS have ordered 500 box cars from the Canadian Car & Foundry Company, and 500 box cars from the Eastern Car Company.

PASSENGER CARS

THE SOUTHERN is inquiring for 10 additional passenger cars.

THE CENTRAL OF NEW JERSEY has ordered a private car from the Pullman Company.

THE NEW YORK CITY RAILWAYS have ordered 70 street cars from the Southern Car Company.

THE NORFOLK & WESTERN has ordered 20 miscellaneous passenger cars from the Harlan & Hollingsworth Corporation.

IRON AND STEEL

THE WESTERN MARYLAND has ordered 1,200 tons of bridge material from the McClintic-Marshall Company.

THE CHICAGO, MILWAUKEE & ST. PAUL has ordered 108 tons of steel from the Fort Bridge Works for widening the Ashland Fargo subway, Chicago, for a third track, and 126 tons of steel from the Jones & Laughlin Steel Company for a bridge over tracks at West Lake street, Minneapolis, Minn.

Supply Trade News

The Goldschmidt Thermit Company, New York, has moved its offices from 90 West street to the Equitable building, 120 Broadway.

The Southern Locomotive Valve Gear Company, Knoxville, Tenn., has recently put on the market a new power reverse gear known as the Brown power reverse gear.

MacArthur Brothers Company and the MacArthur Pile & Foundation Company have moved their New York offices from 11 Pine street to the Equitable building, 120 Broadway.

William E. Eastman, inventor of the Eastman system for heating freight cars, and the founder and president of the Eastman Car Company, Charlestown, Mass., died at his home in Winchester, Mass., on May 15, at the age of 75 years.

W. H. Coverdale and W. W. Colpitts announce that the practice of W. H. Coverdale & Co., Inc., consulting engineers, will hereafter be conducted under the firm name of Coverdale & Colpitts. The firm's offices are at 66 Broadway, New York.

The Terry Steam Turbine Company, Hartford, Conn., announces the appointment of O. E. Thomas, 626 Washington building, Los Angeles, Cal., as district sales manager for a territory covering Arizona and the southern portions of California and Nevada.

The Gary Tube Company has been incorporated with a capital stock of \$100,000 for the purpose of constructing the National Tube Company's \$25,000,000 steel plant at Gary, Ind. Robert W. Campbell, of Chicago, heads the list of incorporators. The Gary Tube Company will be part of the National Tube Company, a subsidiary of the United States Steel Corporation.

Charles F. Schroeder, secretary and treasurer of the Schroeder Headlight Company, whose death at Decatur, Ala., on May 6, has been reported in these columns, entered the headlight business with his father at an early age and when 21 years old took over the management of the company. From a small plating works in 1895, the company has developed into a large manufacturer of electric and oil headlights. Mr. Schroeder was active in business until the time of his death.

J. E. Toole, for the past six years traveling agent of the Traders Despatch Fast Freight Line, has resigned to accept a position in the sales department of the Pyrene Manufacturing Company, and will be connected with the company's Columbus, Ohio, office. Mr. Toole, in addition to being a railway traffic man, has been greatly interested in the problem of fire prevention, and has given up many of his vacations during the last few years to attend the annual conventions of the International Association of Fire Engineers, the membership of which is made up largely of chiefs of fire departments.

E. T. Sawyer, who has been associated with the Commercial Acetylene Railway Light & Signal Company for over eight years, has resigned to accept a position as sales engineer with the Edison Storage Battery Company. Mr. Sawyer from about 1901 to 1904 was with the Western office of the Dressel Railway Lamp Works, of New York, and the Star Brass Manufacturing Company, of Boston. He later spent four years in the employ of the Acme Ball Bearing Company as manager of the railway department. His first three years in the employ of the Commercial Acetylene Railway Light & Signal Company were spent as southern manager. For the last five years he has been connected with the main office at New York.

The Barrett Company, having been convinced that with the workmanship properly safeguarded a Barrett specification roof will last for a minimum period of 20 years without repairs, will henceforth give a twenty-year surety bond guaranty without charge on all Barrett specification roofs of 50 squares or more in the United States and Canada, in towns of 25,000 and over, and in smaller centers where its inspection service is available, provided the roof is laid by a roofing contractor satisfactory to the company and in strict accordance with the Barrett specifi-

cations dated May 1, 1916, and subject to the inspection and approval of the Barrett Company. This surety bond will be issued by the U. S. Fidelity & Guaranty Company of Baltimore.

The Q. & C. Company, New York, has issued the following announcement relative to Bonzano rail joint patents: "In answer to numerous inquiries regarding possible infringement of the so-called Thompson patents by several recent designs of Bonzano rail joints, we herewith give notice that after careful investigation and through advice of counsel, we have taken, from the owners of the Thompson-Thompson patents, a license for the exclusive manufacture and sale of Bonzano rail joints with reinforced heads, covered by the Thompson-Thompson patents. In view of the above, our customers need have no further consideration as to any possible infringement on account of the reinforcing of the heads of our Bonzano joints. The Bonzano joints, which include the Thompson features of reinforcement of the head, will hereafter be known as the "Bonzano-Thompson rail joints."

J. H. McDonald, chief clerk to the superintendent of telegraph of the Pennsylvania Railroad at Philadelphia, has resigned from that position, effective May 15, to accept the position of superintendent of transportation of the Bethlehem Steel Company, with office at Steelton, Pa. Mr. McDonald was born in Concord, Franklin county, Pa., June 29, 1875. He was educated in the public schools of Greencastle, Mount Holly Springs and Shiremanstown, Pa. He later took a special course under Professor Shearer of the Shippensburg State Normal School. While attending school he studied telegraphy at home, and was employed by the Philadelphia & Reading as agent and operator at Longsdorf, Pa., in 1892. In May, 1893, he secured a position with the Pennsylvania Railroad, and worked respectively as manager, examiner, assistant trainmaster, chief despatcher, and chief clerk to the superintendent of telegraph, having held the latter position for the past six years.

C. J. Blair, president Kennicott Company and vice-president of the Corn Exchange National Bank, Chicago, Ill., died on May 10, at his home in that city. He was born at Michigan City, Ind., on April 6, 1845, and was educated at colleges in Racine, Wis., and Crawfordsville, Ind. In 1864, he entered the employ of the Merchants' National Bank at Chicago, of which his father was then president. Two years later he entered the service of Culbertson, Blair & Co., packers and commission merchants. In 1879, he again entered the employ of the Merchants' National Bank and served in various capacities until 1888, when he succeeded his father as president. When the Merchants' National Bank was consolidated with the Corn Exchange National Bank in 1903, Mr. Blair became senior vice-president. He was also president of the Kennicott Company, a member of the Chicago clearing house committee, a director of the South Side Elevated Railroad Company, and a member of the Chicago Board of Trade.

John B. Kilpatrick, vice-president of the Universal Arch Company, Chicago, Ill., died in that city on May 14. Mr. Kilpatrick was born at Philadelphia, Pa., on August 9, 1862, and was educated in Baltimore, Md. He entered the service of the Chicago, Rock Island & Pacific, in 1889, as general foreman at Fairbury, Neb. From 1890 to 1893, he was general foreman of the Colorado division at Goodland, Kans. From 1893 to 1902, he was master mechanic of the Iowa division, at Valley Junction, Iowa. He was stationed at Horton, Kans., as master mechanic from 1902 to 1903, when he was appointed assistant superintendent of motive power, with office at Chicago, Ill. From 1904 to 1912, he was superintendent of motive power at Chicago, and from April 1, 1912, to August 15, 1913, was district mechanical superintendent at Davenport, Iowa, and at Des Moines. From 1913 up to the date of his death he was engaged in the railway supply business, having been elected vice-president and director of the Universal Arch Company, Chicago, on April 1, 1916.

Photo-Engravers Abandon Price Scale

Consumers of photo-engravings will be interested to learn that the Photo-Engravers' Board of Trade of New York has agreed to abandon the "Standard Scale of Prices," which went into effect April 3, 1916, and not to enter into any further combination to fix prices.

In abrogating that scale the photo-engravers have agreed "that from this time on there will be open and free competition

between each and every manufacturer of photo-engraving, and that each and every member of the Photo-Engravers' Board of Trade agrees (with the complete sanction of the Photo-Engravers' Board of Trade itself, and so far as the Board of Trade can bind its members) that he will neither in letter nor in spirit violate the Donnelly law or any portion thereof. We will give notice to our customers that the recent paper entitled 'Standard Scale of Prices' is immediately withdrawn."

This means that every photo-engraver is free to make whatever arrangement he sees fit with customers as to the prices that shall be charged for photo-engravings.

The New York Trade Press Association, appreciating that the new scale that went into effect April 3 demanded an increase of from 20 to 200 per cent in the cost of photo-engravings, and believing that that scale was a clear violation of the Donnelly anti-trust law of the state of New York, presented the matter to District Attorney Swann for such action as he should deem proper. The president, officers and many of the members of the New York Trade Press Association, and Henry Wollman, of Wollman & Wollman, counsel for the association, had many conferences with the district attorney's office with reference to this matter. It can be authoritatively stated that the district attorney had sufficient evidence to indict the members of the Photo-Engravers' Board of Trade, and the co-partnership and corporations represented on the board of trade.

Subpoenas were issued for witnesses to appear before the grand jury. The Photo-Engravers Board of Trade then signed the agreement, stating that the "Standard Scale of Prices" would be immediately withdrawn, and that they would give notice to the trade to that effect.

Since the Photo-Engravers' Board of Trade succeeded in putting a similar scale into effect in Chicago and 34 other cities, the action taken in New York has an extremely important national significance.

TRADE PUBLICATIONS

ELECTRIC GRINDERS.—The Chicago Pneumatic Tool Company has recently issued Bulletin E-39, descriptive of the company's line of Duntley electric grinders.

THE BRINELL METER.—Herman A. Holz, New York, has issued a ten-page booklet describing the Brinell meter for determining the hardness of metals. The book is illustrated with photographs of the testing outfit, and describes the method of operation in detail.

"SIMPLEX" COMPOUND SYSTEM.—Bulletin 109, recently issued by the Economy Devices Corporation, New York, deals with the "Simplex" compound system. The Simplex intercepting valve was described in detail in an article in the *Railway Age Gazette* of May 5, 1916, page 1002.

LOCOMOTIVE APPLIANCES.—Two recent bulletins of the Franklin Railway Supply Company, New York, deal respectively with the Franklin automatic driving box lubricator and McLaughlin flexible conduits. Both booklets illustrate and describe the devices with which they deal, and contain information relative to their application, inspection and repair parts.

AIR COMPRESSORS, WATER DRILLS, ETC.—The Ingersoll-Rand Company, New York, has recently issued three bulletins, designated respectively, Forms 3036, 3029 and 4120. Form 3036 deals with turbo blowers. These blowers are suitable for any air service where the capacity requirements range from 3,000 to 35,000 cu. ft. of free air per minute at pressures of 1 to 2½ lb., and are particularly adapted for such work as foundry cupola blowing; atomizing oil for oil burners; supplying blast to various kinds of heating and annealing furnaces; blowing air for water gas generators; pneumatic conveying systems and for ventilating purposes. Form 3029 describes the "Ingersoll-Rogler" Class "ORC" Corliss steam driven air compressors of the duplex type, with the steam cylinders next to the frames and separated from the air cylinders by open distance pieces. This type of machine is offered in four different combinations of cylinders. The catalogue gives sizes and capacities. Form 4120 describes the Leyner-Ingersoll water drills of both the No. 18 and No. 26 type. It explains the construction in detail, and illustrates the different types, showing several views of typical installations.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company contemplates the construction of a line it is reported on good authority through Ochiltree and Lipscomb counties, Texas.

CHICAGO, MILWAUKEE & ST. PAUL.—This company is resurveying its line from Blackfoot Junction, Mont., east, and expects to ask bids on the work sometime in June.

DULUTH, HURON & SOUTHERN.—The South Dakota Railroad Commissioners have granted authority to the promoters of this company to construct a line from Huron, S. Dak., northeasterly through the counties of Beadle, Clark, Codington, Day and Roberts to the state line. The line is to be extended eventually to a point in Minnesota. The right of way has been secured along most of the proposed route in South Dakota. W. E. Morrow, Huron, is a promoter.

FLORIDA ROADS (ELECTRIC).—Residents of Sarasota are back of a project to build an electric line, it is said, from Tampa, Fla., south to Venice, about 70 miles. A. E. Townsend, Sarasota, Fla., may be addressed.

GEORGIA-TENNESSEE ROADS (ELECTRIC).—An electric railway is projected from Blue Ridge, Ga., it is said, north to Copper Hill, Tenn., about 14 miles. H. P. Mulkey, Blue Ridge, is the promoter.

GREAT NORTHERN.—This company has awarded a contract to A. Guthrie & Company for completing the line between Kilgard, B. C., and Sumas Landing. Grading work for this line was practically completed two years ago, at which time the work was discontinued.

The Great Northern has awarded a contract to A. Guthrie & Company for the construction of 25 miles of new line from Lambert, Mont. west.

ILLINOIS CENTRAL.—This road is doing filling work at Wallace yard, Freeport, Ill., in preparation for additional trackage. About 35,000 yd. of material is being handled. The Illinois Central is also enlarging its yards at Centralia, Ill. About 15,000 cu. yd. of material is being handled, and additional tracks are being laid. The cost of this work has been estimated at about \$75,000.

JOLIETTE & LAKE MANUAN COLONIZATION.—This company has been granted an extension of two years by the Dominion parliament in which to build the projected line from Joliette, Que., north to Lake Manuan, and to a connection with the National Transcontinental, also to build from Joliette southerly to Montreal. J. Ritchie, solicitor, Ottawa, Ont.

NEW ORLEANS, MOBILE & CHICAGO.—Receiver W. F. Owen has been authorized by Judge Toumlin, in the Federal District Court at Mobile, Ala., to begin construction work on the extension from Middletown, Tenn., north to Jackson, 34 miles. The estimated cost of the work is between \$700,000 and \$800,000. Surveys were under way for such an extension in 1911.

NORTHERN PACIFIC.—This company has awarded contracts for the extension of the Sunnyside branch from Grand View, Wash., to Gibbons, a distance of 12 miles, and the extension of the Simcoe branch, a distance of 9 miles, to White Swan, Wash., to A. Guthrie & Company, St. Paul, Minn.

PENNSYLVANIA RAILROAD.—The Yellow Creek branch has been extended 2.19 miles from the Crown Hill Coal Mining Company's mine, east along the south side of Yellow creek, to Brush Valley township, Indiana county, Pa., and is now operated as a part of the Conemaugh division.

ST. LOUIS & SAN FRANCISCO.—This road is lengthening side tracks between Monett, Mo., and St. Louis, and between Springfield, Mo., and Thayer, to accommodate trains of 80 cars.

SAN ANTONIO & NORTH WESTERN.—Surveys are being made for this road from San Antonio, Tex., northwest through Medina Lake, Bandera, Medina City, and Rock Springs to San Angelo, a distance of 240 miles. The company desires to correspond with grading contractors, and is also in the market for equip-

ment of various kinds. H. H. Fielder, chief engineer; A. A. Luther, president, San Antonio, Tex.

TENNESSEE & KENTUCKY.—Plans are reported made by this company to build a line from Nashville, Tenn., north via Springfield, Orlinda and Adairville, Ky., to Russellville, 54 miles, also a 14-mile branch line from Orlinda, Tenn.

WATAUGA & YADKIN RIVER.—Work is now under way building an extension from Darby, N. C., west via Rogers Mill and Boone. The work is being carried out by company forces and involves handling about 14,000 cu. yds. to the mile; one mile of track has been laid. There will be 3 trestles on the line to have a total length of about 700 ft. and a station is to be built at Rogers' Mill. The company now operates a line from North Wilkesboro, N. C., west to Darby and to Grandin, and expects to develop a traffic on the extension in lumber, bark, logs, agricultural products and ores. (No. 26, p. 1032.)

WEST VIRGINIA ROADS.—A lumber road is to be built in Boone county, W. Va., it is said, about 17 miles long. Coal & Crane, Cincinnati, Ohio, and Huntington, W. Va., are back of the project.

RAILWAY STRUCTURES

ALBANY, N. Y.—A contract has been given to the C. P. Boland Company, Albany, by the Delaware & Hudson for building an extension to the present office building on the Plaza at Albany. The structure will be four stories high, with an attic. It will be 50 ft. by 184 ft., of granite, steel and concrete construction, and will cost about \$260,000. (February 18, p. 338.)

ALBUQUERQUE, N. M.—The Atchison, Topeka & Santa Fe has awarded a contract to Joseph E. Nelson & Son, Chicago, Ill., for the erection of a blacksmith shop at Albuquerque. (January 28, p. 186.)

ATLANTIC, IOWA.—The Atlantic Northern has awarded a contract for rebuilding 20 pile trestle bridges, with a total length of about 1,625 lineal feet, to Campen & Company. Company forces are also at work retieing, reditching, and ballasting the road. W. Osborne, engineer maintenance of way.

BRECKENRIDGE, MINN.—The Great Northern will add ten stalls to its roundhouse and will construct a cinder pit and turntable to cost \$900,000, including incidental improvements at Breckenridge.

CARLSBAD, N. M.—The Atchison, Topeka & Santa Fe will build a 100-ton coaling station, a five stall roundhouse and a cinder pit at Carlsbad.

COLUMBUS, OHIO.—The Hocking Valley Railway has awarded a contract to Fritz, Rumer, Cooke, Grant & Co., for building a 15-stall brick engine house with wooden roof at South Parsons avenue, Columbus.

GRAND RAPIDS, OHIO.—The Toledo, St. Louis & Western will replace six single track, through truss spans over the Maumee river. The old piers and abutments will be incased in reinforced concrete jackets, and the new spans will be 146 ft. 9 $\frac{3}{4}$ in. long. The work will require about 1,150 tons of steel and 670 cu. yd. of concrete. The contract for the fabrication and erection of the bridge has been awarded to the Toledo Bridge & Crane Company. Bids are now being received by A. L. Ungewitter, assistant to receiver, for the masonry work. The total estimated cost of the work is \$101,500.

HAZARD, KY.—Plans have been submitted to the War Department by the Louisville & Nashville, it is said, for building a bridge over the North fork of Kentucky river at a point about 1.25 miles below Hazard. The plans call for a concrete arch bridge of three spans, each span to be 80 ft. long.

INDIANAPOLIS, IND.—The Indianapolis Union Railway Company is elevating its tracks in the downtown district. The project involves the construction of 11 bridges at street crossings, the elevation of the train shed and tracks at the Union station, and the construction of extensive retaining walls. The work involves the use of 25,000 tons of steel, the placing of about 350,000 cu. yds. of material in embankments and the depositing of a considerable quantity of concrete, the exact amount of which has not yet been determined. The work is being done

both by contract and company forces. A contract has been awarded to the Marion County Construction Company for the construction of as much of the foundations of the train shed as can be built without interfering with the present station tracks, and this work is now under way. The footings and abutments for the south portions of the Senate avenue, Capitol avenue and Meridian street subways are now being constructed by Dunn & McCarthy. Steel for these three subways is being shipped and it is expected that the erection of the superstructures will commence about June. The cost of the whole project has been estimated at about \$5,000,000. T. R. Ratcliff, assistant engineer maintenance of way.

NEW YORK.—The New York Public Service Commission First district will open bids on June 1, for the construction of station finish on Sections Nos. 12 to 15 of Route No. 5, the Lexington avenue subway. The stations to be finished under this contract are One Hundred and Tenth street, One Hundred and Sixteenth street, One Hundred and Twenty-fifth street, Third avenue and One Hundred and Thirty-eighth street, Mott Haven and One Hundred and Forty-ninth street. The commission is already advertising for bids to be opened May 25, for station finish on Sections Nos. 7 to 11, inclusive, embracing the southern part of the line.

Ocala, Fla.—The Seaboard Air Line and the Atlantic Coast Line will jointly build a passenger station at Ocala. The structure will be about 30 ft. wide and will face 93 ft. on the Atlantic Coast Line track and about 72 ft. on the Seaboard Air Line track, and will be provided with waiting rooms for both white and colored people. The exterior walls of the building will be covered with tapestry brick and trimmed with Indiana limestone. The roof will be of hip construction and covered with red asbestos shingles. Umbrella sheds 250 ft. long will be provided along the tracks of each railway, the shed being connected to the main roof of the station.

SAN ANTONIO, TEX.—The San Antonio Belt & Terminal has awarded a contract for the construction of a new freight and passenger terminal to Thomas & Jones, St. Louis, Mo. The improvements will consist of freight and passenger stations located at Durango and South Flores streets, including tracks from a connection with the Southern Pacific lines near San Antonio river, and necessary team tracks and yard facilities. The freight station will be a brick or reinforced concrete structure, 50 ft. by 300 ft., and the passenger station will be a stone structure of Mission type, modern in every respect.

SEATTLE, WASH.—The Great Northern is building two additions to the Smith's Cove dock building at Seattle. One addition is to be 350 ft. by 100 ft. and the other 200 ft. by 75 ft. Work on both buildings is well under way and they are being constructed by Grant Smith & Company. A temporary warehouse, 400 ft. by 100 ft. is also being constructed at this point.

SIDNEY, OHIO.—The Cleveland, Cincinnati, Chicago & St. Louis has started the erection of a bridge over the Miami river. The contract for the concrete foundations has been awarded to A. J. Yawger & Company, Indianapolis, Ind., and the contract for the superstructure to the King Bridge Company, Cleveland, Ohio. The bridge will consist of four 81-ft. deck girder spans, and the total cost has been estimated at \$38,000. J. B. Hunley, engineer bridges and structures, Cincinnati, Ohio.

SILVERWOOD, IND.—The Toledo, St. Louis & Western will rebuild a bridge across the Wabash river, to consist of four through single-track Pratt trusses and one 36-ft. deck girder span. The contract for the steel, 1,300 tons, has been awarded to the American Bridge Company, and for the erection, to the Toledo Bridge & Crane Company, Toledo, Ohio. Bids for the masonry work, 3,075 cu. yd., are now being received by A. L. Ungewitter, assistant to the receiver. The total cost of the work has been estimated at \$145,000.

VANCOUVER, B. C.—A station is being built at Vancouver by the Vancouver, Victoria & Eastern Railway & Navigation Company, a subsidiary of the Great Northern, and will be owned jointly by that company and the Northern Pacific. The filling for the terminal is being done by A. Guthrie & Company, and contracts for the building work have been awarded to Grant Smith & Company and McDonnell, Limited.

Railway Financial News

CHICAGO, ROCK ISLAND & PACIFIC.—N. L. Amster, of the minority stockholders' committee of the Chicago, Rock Island & Pacific, has given out a statement in part as follows:

"Thus far we have received more than \$9,500,000 voluntary subscriptions to our proposed issue of 8 per cent preferred 'rights,' which attests in a most phenomenal manner the temper of the Rock Island stockholders and their intention to protect their rights in this most valuable property. The theory, therefore, that stockholders would not subscribe to a voluntary financial plan has been exploded. Here we have received voluntary subscriptions to nearly \$10,000,000 in less than five weeks' time, and they are still coming in. Only today we have received a subscription by cable from an English stockholder.

"The fact that we have not received the 75 per cent of the total amount by the 15th of May, while it gives the subscribers the privilege to withdraw or cancel their subscriptions, does not mean that we will be forced to abandon the plan. I feel quite sure that very few, if any, of the stockholders who subscribe will cancel their subscriptions. On the contrary, I am convinced that when our committee sends out its request that the stockholders extend their subscriptions for another 60 days they will not only do so, but may increase their present subscriptions.

"Our reason for imposing such a short limitation of time within which stockholders should subscribe was, first, because of the petition which has been unjustly filed by the counsel for the Peabody committee asking leave to file a bill of foreclosure on the refunding mortgage, the decision on which was set for May 15; secondly, because we did not think it fair to ask stockholders to send in subscriptions which might be held up for an indefinite period if a limit of time was not set. We have had every evidence given that stockholders are serious and that their subscriptions will be extended for any length of time found necessary by our committee.

"Our committee has recently been negotiating with the debenture bondholders' committee looking to the co-operation of the two interests, and while all the details have not been arranged, we have every reason to believe that an adjustment on the lines recently discussed will be adopted that will work out to the satisfaction of the holders of both securities. In this event there will be a united effort by the debenture committee, the Hayden committee, and our committee to furnish the company with the necessary working capital to take it out of the receivership and put it on a sound financial basis.

"It may be stated that under the new arrangement stockholders will be called upon to contribute about the same amount as was called for under the voluntary plan, and that they will receive for their cash contribution a preferred stock which, although it may not carry as high an income rate, should prove nearly as satisfactory.

"Pending the working out of the final details of this new arrangement, our committee will not abandon its plan."

ERIE.—The bond syndicate which was headed by J. P. Morgan & Co. and which took the general mortgage 4 per cent convertible, series D, bonds of the Erie, has been closed by the sale to Lazard Freres of the balance of the bonds remaining in the hands of the syndicate.

GEORGIA & FLORIDA.—H. R. Warfield, one of the receivers, is quoted as saying that arrangements have been made for the extension for one year of the receiver's certificates amounting to \$200,000, and new receiver's certificates amounting to \$50,000 will be issued to take care of maturing equipment trust certificates.

MINNEAPOLIS & ST. LOUIS.—The negotiations which have been carried on between various interests looking toward the adoption of a reorganization plan have been adjourned to June 19.

NEW ORLEANS, MOBLE & CHICAGO.—See item under Railway Construction.